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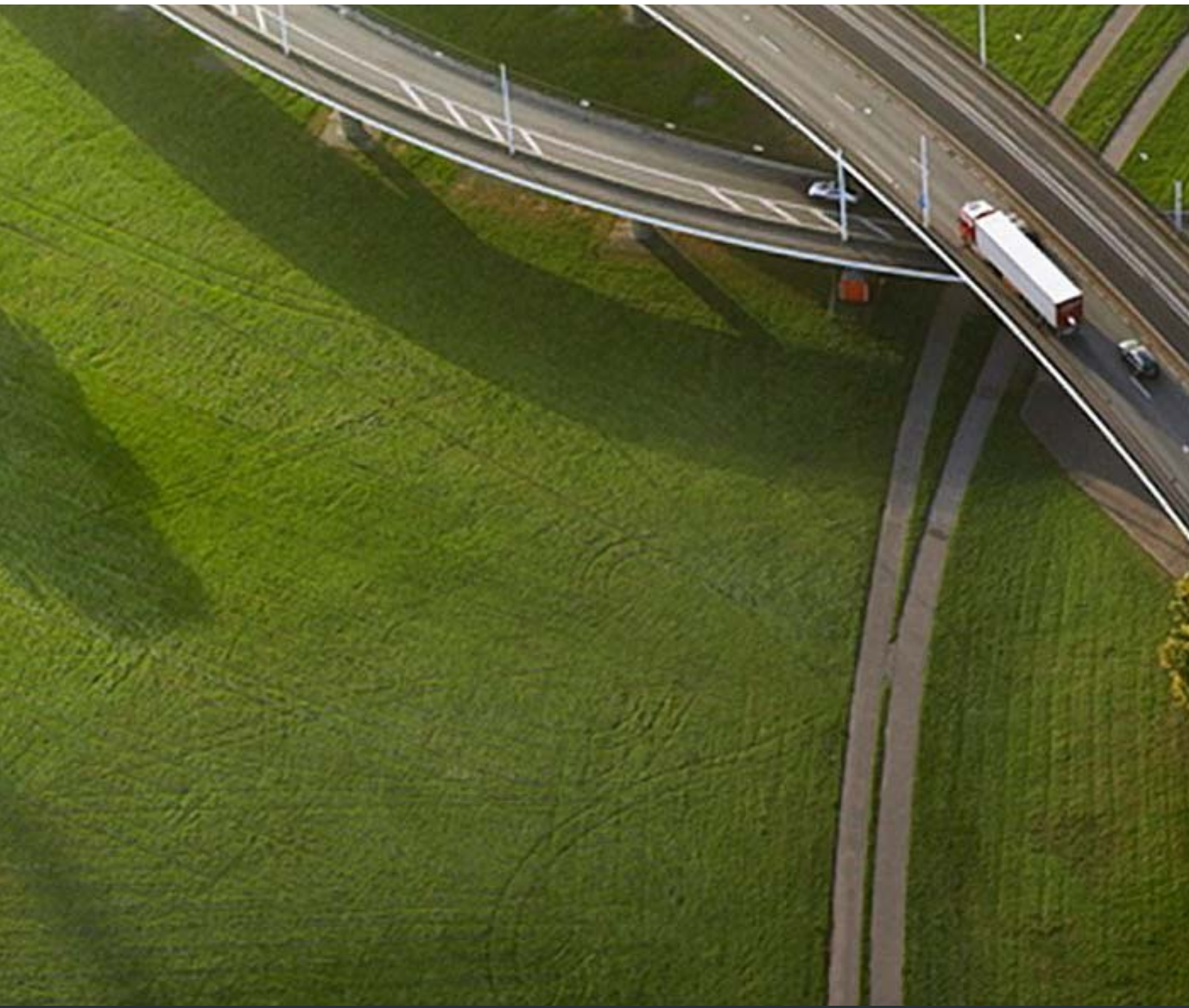

OpenStage WL 3 / OpenStage WL 3 Plus WLAN Handset

Administration Manual

A31003-M2000-M100-3-76A9

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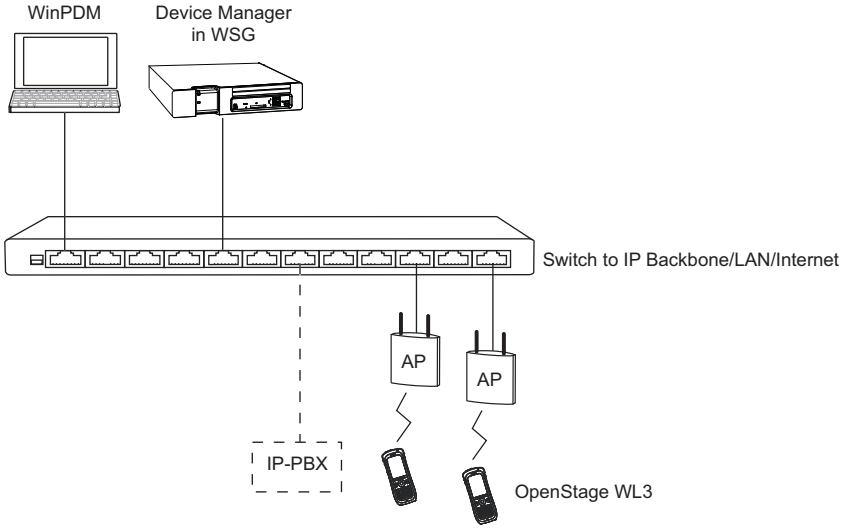
1. Introduction

This document is a guide for installing, configuring, and maintaining the functionality of the WLAN Handset.

The OpenStage WL3 Voice over Wireless Fidelity (VoWiFi) system provides wireless IP-telephony, messaging, and alarm functions to enterprise LANs. Using third-party WLAN products and hardware and software developed in-house, the system enables data and voice transmission together with seamless roaming.

Figure 1. OpenStage WL3 VoWiFi System



This document provides guidelines to install the WLAN Handset in a VoWiFi system. The document describes the settings needed to make the handset function in a VoWiFi system, and is targeted at the following personnel:

- System Administrator
- Service Technician

The handset is first configured using Easy Deployment, or using the Portable Device Manager (WinPDM). In small systems where it is possible to collect all handsets to update settings, daily maintenance is also done by using the WinPDM.OpenStage WL3 WSG Server (WSG) supports managing the handsets centrally using a web interface, without the need to collect the handsets.

The handset behavior can be customized to suite each user profile.

It is recommended that the reader has basic knowledge of the VoWiFi system and basic knowledge of handset registration in the PBX.

1.1 Abbreviations and Glossary

802.11a	IEEE 802.11 standard for transmission rate of up to 54Mbps, operates in the 5GHz spectrum.
802.11b	IEEE 802.11 standard for transmission rate of up to 11Mbps, operates in the 2.4GHz spectrum.
802.11g	IEEE 802.11 standard for transmission rate of up to 54Mbps, operates in the 2.4GHz spectrum.
802.11d	IEEE 802.11 standard for regulatory domains.
802.11e	IEEE 802.11 standard that defines Quality of Service (QoS) for WLAN.
802.11i	Standard for security improvements for 802.11.
802.11n	IEEE 802.11 standard for transmission rate of up to 100 Mbps, operates in the 2.4GHz and 5GHz bands.
802.1D	IEEE MAC Bridges standard (interworking for 802.11 among others).
802.1X	IEEE standard for port-based Network Access Control (authentication).
Ad-hoc WLAN	A WLAN between two wireless capable devices (normally PCs), where no Access Point (AP) is involved.
AES	Advanced Encryption Standard.
ALS	Acoustic Location Signal
AP	Access Point
BSS	Basic Service Set. A WLAN with at least one AP that is configured for it.
BSSID	Basic Service Set Identifier. Hard-coded name of an ad-hoc WLAN, usually the MAC address of the radio. One type of SSID (the other being ESSID).
CCX	Cisco Compatible eXtension
Device Manager	Application for managing devices, editing parameters, and updating devices with new software, without an administrator manually needing to collect the devices, as it is done by Centralized Management over the air (OTA). The Device Manager application runs on an WSG hardware.
DHCP	Dynamic Host Configuration Protocol. Used to send config parameters to TCP/IP clients.
DNS	Domain Name System
DSCP	Differentiated Services Code Point. QoS on the Network Layer. Used both for WLANS and LANs.
DTIM	Delivery Traffic Indication Message
EAP	Extensible Authentication Protocol.
EAP-FAST	Flexible Authentication using secure tunneling.
EAP-TLS	EAP-Transport Layer Security.
ELISE	Embedded LInux SErver: A hardware platform used for WSG modules
ESS	Extended Service Set. WLAN with multiple APs sharing the same SSID.

ESSID	Extended Service Set Identifier. The identifying name of a WLAN. It identifies an AP and distinguishes WLANS from one another. An ESSID is one type of SSID (BSSID is the other).
IM	Interactive Messaging makes it possible to access information from an application, and controlling the information, by selecting a choice received in a message.
License	An authorization to use a licensed function.
MAC	Medium Access Control.
MWI	Message Waiting Indication
NTP	Network Time Protocol
OTA	Over The Air
PBX	Private Branch Exchange: Telephone system within an enterprise that switches calls between local lines, and allows all users to share a certain number of external lines.
PEAP	Protected Extensible Authentication Protocol.
PRI	Primary Rate Interfaces
RSSI	Received Signal Strength Indication.
RTLS	Real-Time Location System
RTS	Request-To-Send.
PTT	Push-To-Talk
Services	Services are predefined functions such as Phone Call, Send Data, Send Message etc. that are accessible from the Service menu.
SIP	Session Initiation Protocol
SSID	Service Set Identifier. User friendly name of a WLAN. Identifier attached to packets sent over a WLAN that acts as a password. Daily used term for ESSID in an ESS wireless topology.
STA	Station. Client in a WiFi network.
QoS	Quality of Service: Defines to what extent transmission rates, error rates, etc. are guaranteed in advance.
UP 6	User Presence (value between 0-7). Wireless QoS at the MAC Layer.
VoIP	Voice over IP.
VoWiFi	Wireless version of VoIP. Refers to an IEEE 802.11a, b, g, n network.
VoWLAN	Voice over WLAN.
WEP	Wired Equivalent Privacy.
Wi-Fi	Wireless Fidelity. The commonly understood name for wireless LAN networks. Originator is Wi-Fi Alliance.
WinPDM	Portable Device Manager (Windows version): Used for managing devices, editing parameters, and updating devices with new software.
WLAN	Wireless Local Area Network. Refers to an IEEE 802.11a, b, g, n network.
WMM	Wi-Fi Multimedia. A Wi-Fi Alliance interoperability certification, based on the IEEE 802.11e standard. Provides basic QoS features to IEEE 802.11 networks.

WPA/WPA2	Wi-Fi Protected Access 2. Security method based on 802.11i standard for wireless networks (data protection and network access control).
WSG	OpenStage WL3 Wireless Service Gateway: Module that enables wireless services to and from the handsets in a WLAN system. It also includes the Device Manager.

1.2 Functionality matrix

The following matrix shows the functionality that currently can be used by the different versions. These functions require configuration in the WinPDM.

	WL3	**WL3 Messenger**	**WL3 Plus**
Company Phonebook	Yes	Yes	Yes
Central Phonebook	Yes	Yes	Yes
Centralized Management	Yes	Yes	Yes
Customized GUI	Yes	Yes	Yes
Interactive Messaging (IM)	No	Yes	Yes
Location	No	No	Yes
Push to Talk (PTT)	No	No	Yes
Multifunction button	Yes	Yes	No
Push Button Alarm	No	No	Yes
Man-down and No-movement alarm	No	No	Yes
Acoustic Location Signal (ALS)	No	No	Yes
Services	No	No	Yes
Voice Mail	Yes	Yes	Yes
Upload Language	Yes	Yes	Yes
Clear lists in charger	Yes	Yes	Yes

The three versions WL3,WL3 Messenger Upgrade, and WL3 Plus use the same hardware and software (except WL3 Plus, which uses a different hardware), and features are enabled by licensing. The WL3 version is an unlicensed WLAN Handset with basic functionality, and the WL3 Messenger UpgradeWL3 Plus versions are licensed WLANHandsets with additional functionalities such as messaging and alarm, respectively.

2. Pre-Installation

Before installing handsets in a VoWiFi system, ensure that the following equipment is available:

- Set up chargers and charge the handset batteries before installation.
- Have a number plan available for the handsets.
- Check that the IP addressing plan is set up to support the amount of handsets to be deployed.

We assume that the VoWiFi system is installed, including some or all of the following components (depending on system configuration):

- DHCP Server. A DHCP server allows devices to request and obtain an IP address from a server that has a list of addresses available for assignment. If the WLAN does not have access to a DHCP server, a list of static IP addresses is necessary.
- Portable Device Manager. The WinPDM is used for administration and programming of the handsets. All settings and updates are in this case done using the DP1 Desktop Programmer cradle connected over USB.
- WSG. The WSG handles all communication between the WLAN and its built-in Device Manager. Before installing the handset, make sure the WSG IP address is available.

For effective administration of a VoWiFi system with several handsets, it is required to have both a WinPDM and a Device Manager included in the WSG. In this case, the WinPDM is only used to allow the handset to access the WLAN system. All other settings and updates are done with the Device Manager in the WSG.

2.1 VoWiFi System IP addresses

To configure the handsets, enter the IP addresses in the table below.

Table 1.

Device	**IP address/Number/ Port**	**Required**
IP-PBX		If used
WSG		If used
Subnet Mask[a]		If used
Number plan	N/A	Yes
NTP Server address[b]		
DNS Server address[a]		
VoIP settings[c]		Yes
Central Phonebook		If used
Syslog server		If used
TFTP server		If used
Ekahau RTLS[d]		If used
DHCP range		

a. Only required if no DHCP is used, that is, static IP is used.
b. Depending on system configuration
c. Gatekeeper IP address or SIP proxy IP address used to access the PBX.
d. The IP address and port to the location server.

3. Programming the WLAN Handset

This section describes how to configure handsets in the following three different ways:

- By inserting it into a DP1 Desktop Programmer cradle connected using USB to the WinPDM.
- Over-The-Air (OTA) using the Device Manager in the WSG.

NOTE: This requires that the IP address to the WSG has been configured in the handset. The IP address is configured using WinPDM or using the handset's Admin menu.

- Using the Admin menu, it is possible to configure the basic network settings. See 9. Administration on page 71 for more information about the settings that can be configured.

It is recommended to use the Device Manager application in the WSG to configure handsets in a large system. The Device Manager can install, upgrade, and configure a large amount of handsets simultaneously. Another benefit is that the collection of the handsets from users is not needed.

The WinPDM configures one handset at a time. The handset is inserted in the DP1 Desktop Programmer, connected to the administrator's computer using USB.

TIP: It is recommended to use templates when configuring handsets. By using a template, the same configuration can easily be applied to many handsets simultaneously.

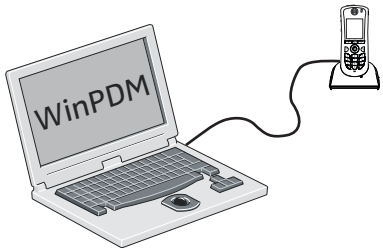
3.1 WinPDM

The WinPDM runs on a PC and is used to configure the handset as follows:

- Connect a DP1 Desktop Programmer cradle through a USB port, to the computer running WinPDM.
- Start WinPDM.
- Place the handset in this cradle connected to WinPDM.

For instructions on how to install and use the WinPDM, see Installation and Operation Manual, Portable Device Manager, Windows version, TD 92712EN.

Figure 2. Configuration of handsets using WinPDM



3.2 WSG

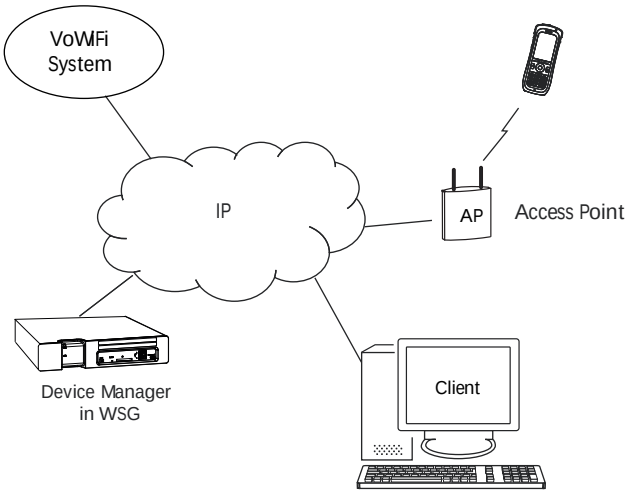
WSG runs on an ELISE3 module.

For instructions on how to use the WSG, see Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

3.2.1 Over-the-Air

There is no external equipment required, besides the Device Manager application in the WSG and the VoWiFi system. Proceed with 4. Installation of WLAN Handsets on page 8.

Figure 3. Configuration of handsets using Over-the-Air (OTA)



4. Installation of WLAN Handsets

This section describes the recommended procedure to install and configure handsets. There are several ways to install a handset but the procedures described here ensures minimal effort for the administrator.

There are two ways of configuring the handsets:

- Local management
- Centralized management (Over-the-air (OTA))

Local management of handsets

NOTE: In larger installations local management is not recommended, since it requires physical access to all handsets.

Either the keypad on the handset, or the WinPDM is used to configure the handsets. It is only recommended to use the keypad, if a quick change of a parameter value is needed, for example, in a lab environment, or in a test installation. It is tedious to enter all parameters using the keypad. Access from the keypad is only available to a limited set of parameters, and to get access to all parameters, the WinPDM must be used.

The WinPDM is aimed for smaller sites where the handsets are near to hand. One handset at a time is configured, when inserted in a Desktop Programmer (DP1) connected to the administrators computer over USB. See Installation steps in small VoWiFi Systems using WinPDM **on page 9**.**Centralized management of handsets**

NOTE: This is also referred to as Over-The-Air (OTA) management, where parameters changes are updated over the WLAN.

A WLAN connection and the Device Manager application (WSG) is used to configure the handsets.

Prerequisites for Centralized management are as follows:

- The handset has a functional WLAN association.
- WLAN parameters are set correctly, to be able to connect to the Messaging system.The handset has the correct settings to access the Device Manager application as follows: - A configured number to be used as identity to login to the Messaging system.
  - The IP address of the Messaging system.

The WLAN and Messaging parameters are set manually, using the keypad or the WinPDM. Then the handset logs into the Messaging system, and downloads the intended handset profile, which contains all other needed parameters for a site.

See 4.2 Installation with Central Device Management (WSG) on page 9.

It is recommended to use the Easy Deployment process, where the needed WLAN parameters and the Messaging system information is distributed automatically to the handset, using a DHCP server (and optionally the Ascom Service Discovery Protocol).

See Appendix C: Easy Deployment on page 89.

NOTE: If the WLAN system uses a 802.1x security protocol that requires certificates for authentication/encryption to the WLAN, the certificates must be prepared and stored individually in the Device Manager for each number, before starting the Easy Deployment process, see 4.2 Installation with Central Device Management (WSG) on page 9.

See 4.1 Handset Installation in the WLAN System using Easy Deployment on page 9

Installation steps in large VoWiFi Systems using WSG and WinPDM

NOTE: If the handset to be installed must use a certificate to access a WLAN, follow the instructions in section 4.3 Installation with WinPDM on page 13.

These WLAN settings are common network settings for all handsets.

1 Create templates in the Device Manager in WSG, one with network settings and another with common settings.

2 Create Numbers and apply the templates.

3 Use either the Easy Deployment procedure, or create a template with identical network settings in the WinPDM.

See 4.1 Handset Installation in the WLAN System using Easy Deployment on page 9 or 4.2 Installation with Central Device Management (WSG) on page 9 for more information.

Installation steps in small VoWiFi Systems using WinPDM

1 Create Numbers.

2 Create one template for all settings in the WinPDM.

See 4.3 Installation with WinPDM on page 13 for more information.

4.1 Handset Installation in the WLAN System using Easy Deployment

With the Easy Deployment procedure, handsets are installed without the need for the WinPDM.

Handsets are automatically installed if the following is fulfilled:

- The LAN and WLAN system is configured for Easy Deployment, see Appendix C: Easy Deployment on page 89.
- The handset is not associated to any network (SSID)
- The handset software is version 5.1.18 or higher
- The Call ID (endpoint number), that is, the phone number of the handset is decided

For further details, see Appendix C: Easy Deployment on page 89.

4.2 Installation with Central Device Management (WSG)

Easy Deployment is the recommended procedure of using the Central Device Management (WSG) for deployment, as the WLAN and Messaging parameters now are configured without the WinPDM.

Easy Deployment uses, in most parts, the same procedure, as the standard Central Device Management (WSG) procedure. Special notes marked “(ED)” show where the procedure is unique for Easy Deployment.

NOTE (ED): With Easy Deployment, it is very important that the building of the number plan and the parameters are correct, since the aim is to avoid using the WinPDM.

4.2.1 Create a Network Template in the Device Manager in the WSG

Create one template that contains the network parameters (also include the security settings). Besides the network parameters, additional parameters can also be set, for example VoIP settings and IP address to WSG.

The template must be created, and applied, to prevent the WSG from restoring the parameters to default during the first synchronization.

NOTE: (ED): If using Easy Deployment, the IP-address to the Device manager in the template, can either be set, or left blank, in which case the server discovery process is used at every startup, see C.3 WSG server discovery on page 91.

NOTE: Only select the parameters that are modified, if all parameters are selected, the system performance decreases.

1 Open a web browser and enter the IP address or NetBIOS name to the WSG.

TIP: Be sure to configure all needed parameters for 802.1x security, but installing Server and/or Client Certificate can not be done using a template. This must be done individually on each Number, see Client certificate on page 103.

2 Click “Device Manager“. You might be prompted to log on the Device Manager.

3 Select the Templates tab and click “New“. The New template window is opened.

4 In the Device type and Parameter version drop-down lists, select the corresponding device type and parameter version to use, respectively.

5 In the Name field, enter a descriptive name for the template.

6 Click “OK“.

7 Set the following network parameters:

- Network settings[1] (located under Network > Network A, B, C, or D)
- VoIP settings[2] (located under VoIP)
- Syslog settings[3] (if any) (located under Device > General)
- WSG settings[4] (located under Device > WSG)

8 Click “OK“ to save the template.

TIP: See Appendix A for tip on how to work with templates when using both WinPDM and WSG.

4.2.2 Create a Common Template in the Device Manager in the WSG

Create another template with the common handset settings applicable to all handsets (exclude the parameters and security settings configured in the Network template). This template contains for example, hidden menu items in the display, certain level of ring signals and vibrators.

NOTE: Only select the parameters that are modified, if all parameters are selected, the system performance decreases.

1 Open a web browser and enter the IP address or NetBIOS name to the WSG.

2 Click “Device Manager“.

1. All required system settings for the WLAN. For example SSID and Security mode. If using a security mode that requires certificates, also use an NTP server, to assure the correct time in the handset, as certificates only are valid within a certain time.
2. For example VoIP protocol, Gatekeeper IP address or SIP proxy IP address used to access the PBX.
3. The parameter “Syslog“ must be enabled in order to set the “Syslog IP address“.
4. IP address and password (if any) to the WSG.

3 Select the Templates tab and click “New“.

4 In the Device Type and Parameter version drop-down lists, select the corresponding device type and parameter version to use, respectively.

5 In the Name field, enter a descriptive name for the template.

6 Set the specific parameters. See section 4.5 Configure a Handset with a Template on page 14 for more information.

4.2.3 Create Numbers in the WSG

Create a range of Numbers and apply the templates previously created in the WSG.

IMPORTANT: Do not add numbers for handsets that are already configured and functional, because these handsets already exist in the system, though they are not saved in the Device Manager application in WSG. The Device Manager application overwrites the existing parameters in the handset.

NOTE: The parameter version of the template must be equal to or less than the selected parameter version.

1 Open a web browser and enter the address to the WSG.

2 Click “Device Manager“.

3 Select the Numbers tab and click “New“. The New numbers window is opened.

4 In the Device Type and Parameter version drop-down lists, select the device type and the parameter version to use, respectively.

NOTE: The device type and parameter version must match the handsets to be used to apply the template.

5 In the Prefix field, enter the numbers’ prefix (if needed).

6 Create a range of numbers by selecting the “Range“ option. Enter the start call number and the end call number in the fields, respectively. Click “OK”.

NOTE: The maximum range that can be added at a time are 100 numbers.

7 Apply the network settings template to the selected handsets. See 4.5.2 Apply a Template to a Handset with a Number on page 15.

8 Apply the common settings template to the selected handsets. See 4.5.2 Apply a Template to a Handset with a Number on page 15.

NOTE (ED): If the 802.1x security protocol with EAP-TLS or EAP-PEAP/MSCHAPv2 is used, also include the server certificate, select which Client certificate to use. The Client certificates must be installed first by editing each Number. Client certificates cannot be distributed using a template, as they are individual.

9 Close the WSG.

4.2.4 Create a Network Template with Initial Configuration in the WinPDM

In a factory delivered handset, the WLAN settings are not configured as required to access the WSG. Using the WinPDM allows the handset to be primed with the WLAN parameters and allows the handset to log in to the Device Manager in WSG for future management over the air.

Create a template with the basic network settings and IP address to WSG. This template is only used once for each handset because it must access the WLAN and

then log on the Device Manager. After log in, the settings in the handset are changed according to the templates, that were applied to the Numbers, in the Device Manager application in WSG.

NOTE: If using Easy Deployment, only perform step 6) below.

1 Open the WinPDM.

2 Do one of the following:

- If a network template was created in the Device Manager in WSG, export this template and import it to WinPDM. See Appendix A for more information. (Recommended)
- Create a template (see 4.5.1 Create a template on page 15) with the following network parameters:

  - Network settings[a] (located under Network > Network A (B, C, or D)

  - WSG settings[b] (located under Device > WSG)

  NOTE: The parameters in this template should be identical to the parameters in the network template created in the WSG.

  a. All required system settings for the WLAN. For example SSID and Security mode.
  NOTE: If the production system is using 802.1x security, this method is not the best option, since the certificates must be manually installed in the handset before they login for the first time (before step 6). The Easy Deployment process overcomes this problem by using a staging WLAN, which does not use 802.1x.
  b. IP address and password (if any) to WSG.

3 Place the handset in the Desktop Programmer (DP1) cradle.

4 Run the template. See 4.5.3 .Apply a Template to a Handset without a Number on page 15.

5 Remove the handset when synchronization is finished.

6 Enter the Number and the password [1] (if any). Press “Login“.

7 Repeat step 3 – 6 for all handsets.

Settings that were stored for the handset in the Device Manager in WSG are now downloaded to the handset. This can, for example, be unique soft- or hot keys that have been prepared earlier. When the settings have been downloaded to the handset, the handset can restart, depending on the parameter changes.

The handset synchronizes with the WSG at startup, and also immediately after any handset parameter change. (The change is done either using the handset keypad, or when editing parameters in the Device Manager in the). Depending on what is changed, and where the change is done, the parameters are synchronized to, or from, the handset.

Those changes are not stored in the WinPDM, as there is no connection between the WinPDM and the WSG Device Management database. The database in the WinPDM synchronizes with the handset, when the handset is placed in the Desktop Programmer (DP1) cradle (online via USB).

NOTE: As there is no connection between the WinPDM and the WSG Device Management databases, except over the handset, the WLAN and WSG settings can differ in the WinPDM and the WSG. Parameters can inadvertently be reverted with old values, when first, the WinPDM synchronization process runs, (when the handset is placed in the Desktop Programmer (DP1) cradle), and after that, (when the handset is removed from the Desktop Programmer (DP1) cradle),

1. The password is only required if the “Password“ parameter is set.

the handset goes online with the Messaging system, and the synchronization process with the WSG runs, and vice versa. The solution for this, is to avoid storing handset numbers in the WinPDM.

4.3 Installation with WinPDM

In a small VoWiFi system, the administration can be handled using only the WinPDM.

The synchronization is in this case not handled automatically by the system when a handset's parameters are changed in the WinPDM. When the parameters have been changed in WinPDM, each handset must be placed in the Desktop Programmer (DP1) cradle connected to the administrator's computer in order to synchronize the parameters with the handset.

1 Open the WinPDM.

2 In the Numbers tab, click "New". The New numbers window is opened.

3 In the Device Type and Parameter version drop-down lists, select the matching device type and the parameter version for the handset to be used, respectively.

4 In the Prefix field, enter the numbers' prefix (if needed).

5 Create a range of numbers by selecting the "Range" option. Enter the start call number and the end call number in the fields, respectively.

6 Click "OK".

7 Create a network settings template (see 4.5.1 Create a template on page 15) with the following network parameters:

- Network settings[1] (located under Network > Network A, B, C, or D)

8 Create another template (see 4.5.1 Create a template on page 15) with the common handset settings applicable to all handsets (exclude the network parameters and used security settings). Example of parameters settings:

- VoIP settings[2] (located under VoIP)
- Software TFTP IP address (if any) (located under Device > General)
- Syslog settings[3] (if any) (located under Device > General)

In addition, settings for hiding menu items in the display, certain level of ring signal and vibrators etc. can also be configured.

9 Apply the network settings template to the handset, see 4.5.2 Apply a Template to a Handset with a Number on page 15.

10 Apply the common settings template to the handset, see 4.5.2 Apply a Template to a Handset with a Number on page 15.

11 Place the handset in the Desktop Programmer (DP1) cradle.

12 In the Device Wizard window, select "Associate with number" and press "OK".

13 Select the handset to associate with. Press "OK".

The number and parameter settings saved in the WinPDM are now synchronized with the handset. In addition, the handset's Device ID is also synchronized with the number in the WinPDM.

If certificates must be used to access a VoWiFi system, also perform the steps 14 - 19.

1. All required system settings for the WLAN. For example SSID and Security mode, and if used, any certificates for 802.11x.
2. VoIP protocol, Gatekeeper IP address or SIP proxy IP address used to access the PBX.
3. The parameter "Syslog" must be enabled in order to set the "Syslog IP address".

14 In the Numbers tab, right-click the handset's number and select "Manage certificates". A Manage certificate window opens.

15 In the Root tab and Client tab, click "Browse" and select the certificates to import. Click "Close".

16 In the Numbers tab, right-click the handset's number and select "Edit parameters".

17 Select "Network X" (X represents A, B, C, or D).

18 In the Security mode drop-down list, select "EAP-TLS".

19 In the EAP client certificate drop-down list, select the client certificate to be used. Click "OK".

20 Remove the handset when synchronization is finished.

Repeat the steps 11-13, 20 (if needed, perform the steps 14-19) for all handsets.

4.4 Installation using the Handset's Admin Menu

It is possible to install a handset using its Admin menu. This is useful when no WinPDM or WSG is available and the handset needs to be installed quickly.

NOTE: It is only possible to configure the basic settings through the Admin menu.

1 There are two options to access the Admin menu:
- If the handset has been factory reset or not been configured; in idle mode, enter 40022.
- If the handset has been configured; press "Menu", select "Settings" and enter 40022.

2 Set the following parameters:
- Network settings[1] (located under Network setup)
- VoIP settings[2] (located under VoIP)
- WSG settings[3] (if any) (located under WSG)
- Syslog settings[4] (if any) (located under Syslog)
- Add license key (if any) (located under Enter license key)

4.5 Configure a Handset with a Template

It is possible to select a handset in the WinPDM and directly change one or more configuration parameters. By using a template, the same configuration can easily be applied to many handsets simultaneously. Templates are also an efficient way to control the changes applied to each handset.

Templates enables configuration of all aspects of a handset from sound volume to keypad shortcuts.

Your supplier can provide example templates for different PBX:s. The handset has full functionality towards the PBX even without such a template. By using such a template, though, the handset is customized for that PBX with menu options for PBX specific functions.

1. All required system settings for the WLAN. For example SSID and Security mode. Note that the certificates cannot be entered, nor referred to, using the keypad.
2. VoIP protocol, Gatekeeper IP address or SIP proxy IP address used to access the PBX.
3. IP address and password (if any) to the WSG.
4. The parameter "Syslog" must be enabled in order to set the "Syslog IP address".

4.5.1 Create a template

1 Open the WinPDM or the Device Manager in the WSG.

2 Select the Templates tab and open the menu “Template > New...“. The New Template window is opened.

3 Select the device type and parameter version that matches the software version installed on the handset. Give the template a descriptive name.

The parameters that are not part of the template are left unchanged on the handset. The parameter version of an installed handset is visible under the Numbers tab or the Devices tab.

4 Click “OK“.

5 Select the check box of each parameter that you want to be part of this template and enter the proper value.

6 Click “OK“ to save the template.

4.5.2 Apply a Template to a Handset with a Number

1 Open the WinPDM or the Device Manager in the WSG.

2 In the Numbers tab, select the handset(s) you want to apply the template to.

NOTE: If several handsets are selected, they must be of the same device type and have the same parameter version.

3 Right-click and select “Run template...“.

Only templates with a parameters version matching the selected handsets are shown. Select the template you want to apply and click “OK“.

The template is applied. The number of parameters in the template affects the time it takes to apply the template to the selected handsets.

When looking at a handset under the Numbers tab, the column “Last run template“ shows the name of the most recently applied template.

4.5.3 .Apply a Template to a Handset without a Number

This feature is only applicable for the WinPDM. It is possible to apply a template to a handset without a number in the WinPDM.

1 Place the handset in the Desktop Programmer (DP1) cradle.

2 In the Found Device Wizard window, select the “Run template“ option.

3 Click “Next >“.

Only templates with a parameter version matching the selected handset are shown.

4 Select the desired template and click “OK“.

The template is applied. The number of parameters in the template affects the time it takes to apply the template to the selected handset.

4.5.4 Save Handset Configuration as a Template

It is possible to save all settings of a handset as template. Note that this does not include contacts, certificates and other personal data. The template will only contain configuration data.

This template can be used as a backup if you want to restore the configuration of the handset at a later stage or as a template that can be applied to a number of handsets.

1 Open WinPDM or the Device Manager in the WSG.

2 In the Numbers tab, select the handset you want to save as a template.

3 Make a right-click and select “Use as a template...“. Enter a descriptive name for the template.

4 The Edit template window is opened. By default, all parameters are selected and are saved when clicking “OK“.

If one or more parameters should be excluded, remove them by clearing the check box next to the parameter.

Some parameters are user specific. If it is decided to apply this type of template to several handsets, it is recommended to exclude the following parameters:

- User display text - A text string displayed in idle mode. The parameter is located directly under “Settings“.
- Phone lock PIN code - The security code used to unlock the keypad. The parameter is located under Settings > Locks.
- Endpoint ID - The identity/name of the user registered in the PBX. The parameter is located under VoIP > General.

5 Click “OK“.

4.5.5 Synchronizing a Handset with WinPDM

After installing and saving a handset, it is synchronized each time it is connected to the WinPDM. The synchronization transfers parameter changes between the handset and the WinPDM and vice versa as follows:

- If a parameter has been changed in the handset, it is transferred to the WinPDMWSG.
- If a parameter has been changed in the WinPDMWSG while the handset was disconnected, it is transferred to the handset.

If the same parameter has been changed in both the WinPDMWSG and the handset, the value in WinPDMWSG will be transferred to the handset.

4.5.6 Configure Handset without Saving It in WinPDM

It is possible to configure a handset without saving it in the WinPDM. An unsaved handset does not have the symbol ✓ in the Saved column. The settings in the handset can be synchronized and saved in the WinPDM later on. However, it is recommended to save the handset in WinPDM, if backup is required. For example when a handset needs to be replaced.

1 Place the handset in the Desktop Programmer (DP1) cradle.

2 Open WinPDM.

3 In the Numbers tab, select the unsaved handset you want to configure.

4 Select Number > Edit parameters.

5 The Edit parameters window is opened. Edit the parameters of the handset and click “OK“.

6 Remove the handset from the Desktop Programmer (DP1) cradle. The handset is no longer visible in the WinPDM and the settings are only saved in the handset.

5. Maintenance

5.1 Handset

In an existing VoWiFi system, it is important to be able to replace handsets, install new handsets, and exchange faulty handsets. The recommended procedure is to use a template with basic network settings for log in, created in the WinPDM, and then import the rest of the settings that were created by the templates in Device Manager in WSG

It is also important to be able to upgrade system parameters and security settings in the handsets. These upgrades are preferably done in the WSG, if available.

If you use WinPDM and WSG, do one of the following:

- If you want to install new handset, see 4.2 Installation with Central Device Management (WSG) on page 9.
- If you want to create spare handsets to be used when broken handsets need to be replaced later on, see 5.1.1 Configure Spare Handsets without a Number in Large Systems.

If only WinPDM is used, do one of the following:

- If you want to install new handset, see 4.3 Installation with WinPDM on page 13.
- If you want to replace a broken handset, see 5.2.4 Replacement of Handset with WinPDM Only on page 26.

5.1.1 Configure Spare Handsets without a Number in Large Systems

In large systems where WSG is used, it is recommended to configure a few spare handsets without a number to quickly replace a broken handset later on.

Create a Template

1 Open WinPDM.
2 Select the Templates tab and click “New“. The New template window is opened.
3 In the Device type and Parameter version drop-down lists, select the matching device type and parameter version respectively, for the spare handset to use.
4 In the Name field, enter a descriptive name of the template.
5 Click “OK“.
6 Set the following network parameters:
- Network settings[1] (located under Network > Network A, B, C, or D)
- VoIP settings[2] (located under VoIP)
- Syslog settings[3] (if any) (located under Device > General)
- WSG settings[4] (if any) (located under Device > WSG)

7 Click “OK“ to save the template.

Apply Template to a Handset without a Number

1 Place the handset in the Desktop Programmer (DP1) cradle.
2 In the Found Device Wizard window, select the “Run template“ option.

1. All required system settings for the WLAN. For example SSID and Security mode.
2. For example VoIP protocol, Gatekeeper IP address or SIP proxy IP address used to access the PBX.
3. The parameter “Syslog“ must be enabled in order to set the “Syslog IP address“.
4. IP address and password (if any) to the WSG.

3 Click “Next >“.

Only templates with a parameter version matching the selected handset are shown.

4 Select the desired template and click “OK“.

The template is applied. The number of parameters in the template affects the time it takes to apply the template to the selected handset.

5 Switch off the handset when User name and Password are displayed.

TIP: If the handset replaces a broken handset, continue with 5.2.2 Replacement of Handset with WSG on page 23.

5.1.2 Upgrade Handset Software

NOTE: Read the software Release Notes before changing the software.

The handset software can be upgraded over the air using Centralized Device Management (WSG) or a TFTP server, or by cable using WinPDM.

Upgrade Handset Parameter

A parameter upgrade can restart the handset, for example, when upgrading the NTP server. The text “Remotely updated” is shown in the handset display when the handset restarts after an upgrade.

5.1.3 Upgrade Software OTA using TFTP

If no WSG is available, it is recommended to use software upgrade OTA using TFTP, which is used in small VoWifi systems.

The benefit is that the handsets do not need to be collected by the administrator since the software upgrade is performed over the air.

To upgrade the software using TFTP, perform the following:

1 If needed, configure the handset in WinPDM to access a TFTP server, see Configure Access to the TFTP Server.

TIP: It is recommended to configure the TFTP server’s IP address when installing the handsets. See 4.3 Installation with WinPDM on page 13.

2 If needed, upload a new software information file (packageinfo.inf) and a software (.bin) file to the TFTP server. These files are provided by your supplier. First rename the .pkg file to .zip and then unzip the files. Then the needed .inf and .bin files are available.

See the manual for the TFTP server used, for more information on how to upload files.

3 Restart the handset. After the handset restarts, it connects to the TFTP server and downloads the software information file (.inf) that contains information about the software version. If the software version differs from the handset’s software version, the handset downloads the software file (.bin) from the TFTP server. The handset restarts when the software upgrade is performed.

Configure Access to the TFTP Server

1 Place the handset in the Desktop Programmer (DP1) cradle.

2 Open the WinPDM.

3 Open the Numbers tab and select the handset.

4 Right-click and click “Edit parameters“.

5 Select Device > General.

6 In the Software TFTP IP address field, enter the IP address to the TFTP server.

7 Click “OK“.

5.1.4 Upgrade Software using WinPDM

Software upgrade using WinPDM is performed in small VoWiFi systems. The handsets need to be collected by the administrator because the software is upgraded using the connected to WinPDM.

1 Open the WinPDM.

2 In the Devices tab, right-click the handset to be upgraded. Select “Upgrade software...“.

3 In the Available files drop-down list, select the desired software file (.bin).

If needed, import the software file to be used by clicking “Import“. Locate the software file (.bin or .pkg) and click “Open“.

4 Click “OK“. The dialog window “Shutting down” followed by “Remotely updated” is shown in the handset display.

5.1.5 Upgrade Software Over the Air (OTA) through Centralized Device Management (WSG)

Software upgrade using WSG is performed in large VoWiFi systems. The benefit is that the handsets do not need to be collected by the administrator because the software upgrade is performed over the air (OTA).

1 Open the Device Manager in the WSG.

2 Open the Devices tab and select the handsets to be upgraded.

3 Right-click and click “Upgrade software...”.

4 In the Available software drop-down list, select the desired software file (.bin).

If needed, import the software file to be used by clicking “Import“. Locate the software file (.bin or .pkg) and click “Open“.

5 In the Upgrade section and Activate new software section, select when the software is upgraded and activated on the handset, respectively.

6 Click “OK“.

TIP: It is also possible to upgrade several handsets of the same device type simultaneously using the Baseline function in the WSG. See Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

5.1.6 Recapture the Earlier Software

The handset stores two software versions which makes it possible to force the handset to jump back to the earlier software. This feature is used if the current software does not work properly.

NOTE: The handset must be switched off to be able to load the earlier software.

Press and hold the keys “7” and “8” and press On/Off key at the same time. The handset loads the earlier software and keeps it, if the handset is not restarted.

5.1.7 Upgrade Handset Functionality using License

Users can upgrade a handset by downloading a license. The following license is available:

- WL3 Messenger Upgrade License

There are three alternatives to upgrade a handset:

- Automatic upgrade, see Automatic license upgrade.
- License upgrade using import/export, see License upgrade using import/export.
- Manual upgrade, see Manual license upgrade.

NOTE: A handset can be re-licensed up to 99 times.

Automatic license upgrade

Use this option if the WinPDM has an internet connection to the License Server.

1 Open the WinPDM.

2 Place the handset in the Desktop Programmer (DP1) cradle.

irst time the handset logs on the WinPDM, the license key is automatically downloaded to the handset, go to step 4.

3 If the handset is logged on to the WinPDM after the first time, no automatic check for licenses is done. Synchronize the WinPDM and license server as follows:

- Select the “Licences“ tab.
- Right-click the handset in the list.
- Select “Refresh“.

The license key is downloaded to the handset.

4 The handset restarts. See also 5.1.7 Upgrade Handset Functionality using License on page 20 to view the handset’s license option(s).

If the handset is updated to a new device type (to WL3 Messenger Upgrade License), both the new device and the old device is displayed in WinPDM. The old device has to be manually removed.

License upgrade using import/export

Use this option if the WinPDM has no internet connection to the License Server. A product information file (.XML) must first be exported from the WinPDM, and then imported to the License Web.

1 Place the handset in the Desktop Programmer (DP1)cradle.

2 Open the WinPDM.

- Select the “Licences“ tab.
- Right-click the handset(s) in the list.
- Select “Export“.
- Save the file on a computer with an internet connection to access the License Web later on.

3 In a web browser, enter the address to the License Web:

“https://www.xxxxxxxxxx“

The License Web is used for;

- Importing the product information file
- Viewing/Purchasing the license(s) for the handset(s)
- Downloading the license file containing the license key(s) for the handset(s)

See the online help on the License Web for information on how to use the License Web.

4 When the license file (.XML) containing the license key(s) is downloaded from the License Web, select File > Import > Licences in the WinPDM to import the file.

5 When the file is imported, the license key(s) is downloaded to the handset(s), and the handset restarts. See also 5.1.7 Upgrade Handset Functionality using License on page 20 to view the handset’s license option(s).

If the handset is updated to a new device type (to WL3 Messenger Upgrade License), both the new device and the old device are displayed in WinPDM. The old device has to be manually removed.

Manual license upgrade

Use this option if the serial numbers of the handset cannot be exported to a file because a WinPDM is not in use. The serial number(s) must be manually entered in the License Web to get the corresponding license key for the handset. The license key must also be manually entered in the handset. See the online help on the License Web for information on how to get a license key.

TIP: If several handsets are upgraded, it is recommended to use License upgrade using import/export on page 20.

The license key is added using the Admin menu in the handset, see 9.1 Admin Menu Tree on page 71 for information on how to activate the Admin menu.

TIP: It is also possible to press *#35# in idle mode for quick access to the “Enter license key“ menu.

1 Press the soft key “Menu“.

2 Select “Calls“.

3 Select “Admin menu“.

4 Select “Enter license key“.

5 Enter license key without blanks.

6 Press “OK“.

If the license key is valid, a dialog window “License key accepted“ is shown. The handset restarts.

If the handset has been updated to a new device type (to WL3 Messenger Upgrade License), both the new device and the old device are displayed in WinPDM. The old device has to be manually removed.

Move License

It is possible to move a product license (WL3 Messenger Upgrade License) to an unlicensed handset. Any optional licenses follow. For example, aWL3 Messenger Upgrade license can be moved from a handset with a broken display to an unlicensed handset. The broken handsetcan then be sent for repairs.

Prerequisites: A WinPDM that supports the move license function, and a connection to the license server.

To move a license using the WinPDM:

1 Place the licensed handset in the desktop programmer.
2 On the Licenses tab, select the handset online.
3 On the License menu, click “Move license...”.
4 In the Move license dialog, select the unlicensed handset and click “OK”.
The handset in the desktop programmer is restarted.
5 Place the unlicensed handset in the desktop programmer.
6 On the Licenses tab, select the handset online.
7 On the License menu, click “Refresh”.
The handset in the desktop programmer is restarted.

5.1.8 Perform a Factory reset

When a factory reset is done on a handset, all configuration settings are restored to default values; PBX subscriptions, contacts, messages, downloaded language, certificate etc. are removed. The software and licensesare left intact.

Factory Reset using WinPDM or Device Manager (WSG)

1 Open the WinPDM.
2 Place the handset in the Desktop Programmer (DP1) cradle.
3 In the Device tab, mark the handset to be factory reset. Note that the handset must be online.
4 In the Device menu, select “Factory reset“. Alternatively, right-click the handset and select “Factory reset“.
5 A Reset devices window appears, click “Yes“. The handset is restarted.

Factory Reset using Handset

It is possible to factory reset a handset from its Admin menu.

1 To activate the Admin menu, select Menu > Settings and enter 40022.
2 Select “Factory Reset“.
3 A Reset portable? window appears, press “Yes“. The handset is restarted.

5.2 Replacement of Handsets

A handset can be replaced with a spare handset if it is broken. The handset registered in WinPDM or WSG, is associated with its device type, device ID, and extension. During the replacement procedure, the broken handset’s device type and extension are associated with the spare handset’s device ID.

5.2.1 Replacement Procedure Choice

- If you have WSG and already have applied the network template to the spare handset(s) to log on later, see 5.2.2 Replacement of Handset with WSG on page 23.
- If you have both WinPDM and WSG, and need to apply the network template to the spare handset(s) to log on later, see 5.2.3 Replacement of the Handset with

WinPDM and WSG.

- If you only have WinPDM, see 5.2.4 Replacement of Handset with WinPDM Only.

Data included in a replacement transfer

The following data is replaced during a replacement:

- User parameters
- Contacts (entered by the user)

Note that the following data is not replaced:

- Call list
- Messages
- Company phonebook
- Downloaded language
- Certificates
- Licenses[1]

5.2.2 Replacement of Handset with WSG

There are two different replacement procedures as follows:

- If the broken handset and the spare handset have the same device type and functionality license, see Replace without Move Licenses in WSG.
- If the broken handset and the spare handset do not have the same device type and/or functionality license, the license must be moved to the spare handset, see Replace and Move Licenses in WSG on page 23.

Replace without Move Licenses in WSG

Both the broken handset and the spare handset must be of the same device type and have same functionality license.

1 In both handsets, press *#34# in idle mode and select “License“ to check that they have same device type and licenses.

If the login screen is displayed in the spare handset, press “Info“, and select “License“.

2 If the broken handset is online in the Device Manager, switch off the handset to make it offline.

3 Take a spare handset prepared with the network settings (including the IP-address to the WSG).

4 Enter the number and leave the password blank. Press “Login“.

The spare handset is automatically updated from the WSG and might be restarted depending on the changed settings. The last stored settings for the broken handset in the WSG are transferred to the spare handset.

Replace and Move Licenses in WSG

The broken handset and the spare handset do not have the same device type and/or have the same functionality license.

1. A handset’s license(s) can be moved to an unlicensed handset (WSG) if following the replacement instructions in Replace and Move Licenses in WSG on page 23.

The spare handset must be an unlicensed WL3 to move the licenses to the spare handset. To check that the handset is unlicensed, press *#34# in idle mode and select “License“. Only WL3 must be displayed here.

1 Make sure that the broken handset is saved in the Device Manager (indicated by a ✓ in the Saved column. If not, in the Numbers tab, right-click the broken handset and select “Save“.

2 Switch the broken handset off. The handset appears as offline in the Device Manager.

3 Take an unlicensed spare handset (WL3) prepared with the network settings (including the IP-address to the WSG).

4 Enter the number and leave the password blank. Press “Login”. The handset is now online in the Device Manager.

5 Make sure that the spare handset is saved in the Device Manager (indicated by a ✓ in the Saved column. If not, in the Numbers tab, right-click the spare handset and select “Save“.

6 Switch the spare handset off. The handset appears as offline in the Device Manager.

7 Switch the broken handset on. The handset appears as online in the Device Manager.

8 In the Device Manager, select the “Licenses“ tab.

9 Right-click the broken handset and select “Move license...“.

10 In the Move license window, select the WL3 that should receive the license. Press “OK“.

11 The broken handset restarts and has now become a WL3. Switch the broken handset off. The handset appears as offline in the Device Manager.

12 Switch the spare handset on. The handset appears as online in the Device Manager.

13 In the Device Manager, select the “Licenses“ tab. Right-click the spare handset and select “Refresh“.

The spare handset is automatically updated from the WSG and restarted. The last stored settings and licenses for the broken handset in the WSG are transferred to the spare handset.

5.2.3 Replacement of the Handset with WinPDM and WSG

If the spare handset to be used must be factory reset or no network template has been applied, a WinPDM is needed to apply the network template to the spare handset. When the network template is added, the handset can log on to the Device Manager.

There are two different replacement procedures as follows:

- If the broken handset and the spare handset have the same device type and functionality license, see Replace without Move Licenses using WinPDM and WSG.
- If the broken handset and the spare handset do not have the same device type and/or functionality license. The license must be moved to the spare handset, see Replace and Move License using WinPDM and WSG on page 25.

Replace without Move Licenses using WinPDM and WSG

Both the broken handset and the spare handset must be of the same device type and have same functionality license.

1 In the handset, press *#34# in idle mode, and select “License“ to check that both handsets have same device type and licenses.

2 Make sure that the broken handset is saved in the Device Manager (indicated by a ✓ in the Saved column. If not, in the Numbers tab, right-click the broken handset and select “Save“.

3 Switch the broken handset off. The handset appears as offline in the Device Manager.

If the spare handset is not prepared with the basic network settings, also perform the steps 4 - 7.

4 Open the WinPDM.

5 Place the spare handset in the Desktop Programmer (DP1) cradle.

6 Run the template with the basic network settings containing (see 4.5 Configure a Handset with a Template on page 14):

- Network settings[1] (located under Network > Network A, B, C, or D)
- VoIP settings[2] (located under VoIP)
- WSG settings[3] (located under Device > WSG)

7 Remove the handset from the Desktop Programmer (DP1) cradle. The handset restarts, depending upon parameter changes.

8 Enter the number and the password[4] (if any). Press “Login”.

The spare handset is automatically updated from the WSG and restarts, depending upon parameter changes. The last stored settings for the broken handset in the WSG are transferred to the new handset.

Replace and Move License using WinPDM and WSG

The broken handset and the spare handset do not have the same device type and/or have the same functionality license.

The spare handset must be an unlicensed WL3 to move the licenses to the spare handset. To check that the handset is unlicensed, press *#34# in idle mode, and select “License“. Only WL3 must be displayed here.

1 Make sure that the broken handset is saved in the Device Manager (indicated by a ✓ in the Saved column. If not, in the Numbers tab, right-click the broken handset and select “Save“.

2 Switch the broken handset off to take the handset offline.

3 Open the WinPDM.

4 Place the unlicensed spare handset (WL3) in the Desktop Programmer (DP1) cradle.

5 Run the template with the basic network settings containing (see 4.5 Configure a Handset with a Template on page 14):

- Network settings[1] (located under Network > Network A, B, C, or D)
- VoIP settings[2] (located under VoIP)
- WSG settings[3] (located under Device > WSG)

6 Remove the handset from the Desktop Programmer (DP1) cradle. The handset restarts.

1. All required system settings for the WLAN. For example SSID and Security mode.
2. VoIP protocol, Gatekeeper IP address or SIP Proxy IP address used to access the PBX.
3. IP address and password (if any) to the WSG.
4. The password is only required if the “Password“ parameter is set.

7 Enter the number and the password[3] (if any). Press “Login”.

8 Make sure that the spare handset is saved in the Device Manager (indicated by a ✓ in the Saved column. If not, in the Numbers tab, right-click the spare handset and select “Save“.

9 Switch the spare handset off to take the handset offline.

10 Switch the broken handset on to take the handset online.

11 In the Device Manager, select the “Licenses“ tab.

12 Right-click the broken handset and select “Move license...“.

13 In the Move license window, select the WL3 that should receive the license. Press “OK“.

14 The broken handset restarts and has now become a WL3. Switch the broken handset off. The handset appears as offline in the Device Manager.

15 Switch the spare handset on. The handset appears as online in the Device Manager.

16 In the Device Manager, select the “Licenses“ tab. Right-click the spare handset and select “Refresh“.

The spare handset is automatically updated from the WSGand restarted. The last stored settings and licenses for the broken handset in the WSG are transferred to the spare handset.

5.2.4 Replacement of Handset with WinPDM Only

Replacement through WinPDM is used in small VoWiFi systems or when WSG is not available.

- If the broken handset and the spare handset have the same device type and functionality license, see Replace without Move Licenses using WinPDM.
- If the broken handset and the spare handset do not have the same device type and/or functionality license. The license must be moved to the spare handset, see Replace and Move Licenses using WinPDM.

Replace without Move Licenses using WinPDM

Both the broken handset and the spare handset must be of the same device type and have same functionality license.

1 In both handset, press *#34# in idle mode and select “License“ to check that they have same device type and licenses.

Alternatively, if the spare handset has been factory reset, press “Info“ and select “License“.

2 Place the broken handset in the Desktop Programmer (DP1) cradle.

3 Open the WinPDM.

4 Make sure that the handset is saved in the WinPDM. In the Numbers tab, a saved handset has the symbol ✓ in the Saved column. If not, right-click the handset and select “Save“ to transfer the settings to the spare handset later on.

5 If the spare handset has been previously used, perform a factory reset, see 5.1.8 Perform a Factory reset on page 22.

6 Place the spare handset in the Desktop Programmer (DP1) cradle.

7 A Found Device Wizard window appears. Select “Associate with Number“ and click “Next >“.

8 In the list, select the broken handset to be replaced with the spare handset. Click “OK“.

The broken handset is replaced and its settings are transferred to the spare handset.

Replace and Move Licenses using WinPDM

The broken handset and the spare handset do not have the same device type and/or have the same functionality license.

The spare handset must be an unlicensed WL3 to move the licenses to the spare handset. To check that the handset is unlicensed, press *#34# in idle mode and select “License“. Only WL3 must be displayed here.

1 Place the broken handset in the Desktop Programmer (DP1) cradle.

2 Open the WinPDM.

3 Make sure that the broken handset is saved in the WinPDM. In the Numbers tab, a saved handset has the symbol ✓ in the Saved column. If not, right-click the handset and select “Save“ in order to transfer the settings to the spare handset later on.

4 Place an unlicensed spare handset () in the Desktop Programmer (DP1) cradle.

5 Run the template with the basic network settings containing (see 4.5 Configure a Handset with a Template on page 14):

- Network settings[1] (located under Network > Network A, B, C, or D)
- VoIP settings[2] (located under VoIP)

The handset can be restarted depending on parameter changes.

6 Place the broken handset in the Desktop Programmer (DP1) cradle.

7 In the WinPDM, select the “Licenses“ tab.

8 Right-click the broken handset and select “Move license...“.

9 In the Move license window, select the WL3 that should receive the license. Select “Do Nothing”. The broken handset restarts and has now become a WL3.

10 Place the spare handset in the Desktop Programmer (DP1) cradle. The spare handset is restarted and the licenses for the broken handset in the WinPDM has been transferred to the spare handset.

11 A Found Device Wizard window appears. Select “Associate with Number“ and click “Next >“.

12 In the list, select the broken handset to be replaced with the spare handset. Click “OK“.

The spare handset can be restarted and the settings for the broken handset in the WinPDM are transferred to the spare handset.

5.3 Change Number of a Handset

It is possible to change the number of a handset, but keep all other settings in the handset.

1 Open WinPDMor the Device ManagerWSG.

2 Open the Numbers tab, and select the handset to be updated with a new number.

3 In the Number menu, select “Rename...“. Alternatively, right-click the handset and select “Rename...” from the menu that appears.

4 In the New prefix field, enter the new prefix (if needed).

1. All required system settings for the WLAN. For example SSID and Security mode.
2. VoIP protocol, Gatekeeper IP address or SIP Proxy IP address used to access the PBX.

5 In the New number field, enter the new number.

NOTE: Make sure that the new number does not exist in another system. If several handsets have the same number, their settings overwrite each other when synchronizing with WSG/ or WinPDM.

6 Click “OK“.

The new number is synchronized with the handset when it is connected to WinPDM or WSG.

5.4 Update Parameters using WSG

This section describes the general procedure to change/update parameters using the WSG. The update starts when the handset is idle and does not interrupt an ongoing call.

NOTE: Only select the parameters that are changed, if all parameters are selected, the system performance decreases.

1 Open the WSG.

2 Create a new template with only the parameters to be changed.

3 Select the numbers that should be updated and apply the template.

The handsets are automatically updated from the WSGand can be restarted depending on which parameters are changed.

5.5 Perform a Security Upgrade using WSG

This section describes how to perform an update/change of the WLAN password/ authentication using the WSG.

IMPORTANT: Change settings in the handset before change settings in the AP. Else, synchronization of new settings to the handset settings cannot be performed.

TIP: Leave one access point with the old configuration to allow switched off handsets to receive the updates when they are turned on. Bring the handset to that APs coverage area.

1 Open the WSG.

2 Create a new template with the new security settings.

- Security mode[1]

3 Apply the new template to the handsets.

The handsets are automatically updated from the WSG and restarted.

NOTE: At this time, the handsets have no access to the WLAN system.

4 Change the security settings for the APs.

The handsets are now able to access the WLAN.

1. All required settings for the WLAN. For example User name, Password, Regulatory domain etc.

5.6 Upgrade the Template

The upgrade procedure of the templates definition version is described in the Installation and Operation Manual, Portable Device Manager, Windows version, TD 92712ENInstallation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

5.7 Create a Configuration Backup

It is recommended to have a backup of the configuration in the handsets and the site.

The backup procedure is described in the Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

6. Handset Configuration

NOTE: This section describes settings in parameter definition files (.def). These files are regularly updated and settings can change slightly. For example "On" to "Enable" or a parameter can be moved to another directory.

The handset requires some settings to function in the VoWiFi system. All settings are done in the WinPDMWSG. This section describes the available settings for the handset. The first part explains network settings and the second part explains the handset settings.

For more information, see the WinPDM Online Help that is accessible for each parameter by clicking the icon in the Edit parameters view, or the Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

6.1 Select Network

The handset can switch between four different WLAN system configurations called Network A, Network B, Network C, and Network D. The name can be changed (using WinPDM or WSG) and is visible in the handset, see 6.1.2 Change Name of Network. A handset can be configured for up to four different WLANs but only for oneWSG and one VoIP System.

The configured networks in WinPDM must have a SSID value to view them in the handset.

Network A is the default system and used throughout this manual.

1 Select Network > General.

2 In the Active network drop-down list, select “Network A”.

6.1.1 Change Active Network

1 Select Network > General.

2 In the Active network drop-down list, select “Network A“, “Network B“, “Network C“, or “Network D“.

6.1.2 Change Name of Network

The name is shown when selecting network in the handset.

1 Select Network > Network A (or B, C, or D).

2 In the Network name field, enter the name of the network.

6.1.3 Enable Switch between Networks

The handset can be configured to switch between networks on the site.

1 Find parameter Network > General > Auto-switch network, and select “Enable”.

Parameter Auto-switch network time-out appears. This parameter defines the time before the handset tries to connect with the next included network.

2 Enter a value in seconds for parameter Auto-switch network time-out.

3 For the networks that should be included in the auto-switch network:

Find parameter Network > Network A (B, C, D) > Include in auto-switch network, and select “Yes” to enable switch to Network A (B, C, D).

6.2 IP Address Settings

The IP address settings can be configured in two ways.

- The handset can configured to receive an IP address automatically from a DHCP server, see 6.2.1 Automatic IP Address Settings.
- If no DHCP server is used, a unique IP address must be entered manually for each handset, see 6.2.2 Static IP Address (Manual) Settings.

6.2.1 Automatic IP Address Settings

1 Select Network > Network A (or B, C, D).

2 In the DHCP mode drop-down list, select “Enable”.

The Phone IP address, Subnet mask, and Default gateway are automatically set up.

6.2.2 Static IP Address (Manual) Settings

1 Select Network > Network A (or B, C, D).

2 In the DHCP mode drop-down list, select “Disable (static mode)”. Additional parameters will be displayed.

3 In the Phone IP address field, enter the unique IP address for the handset.

4 In the Subnet mask field, enter the subnet mask.

5 In the Default gateway field, enter the IP address for the default gateway.

DNS Server Settings

It is possible to configure the DNS server that the handset uses. If the primary DNS server is available, it is always used. Otherwise, the secondary DNS server is used.

NOTE: The DNS parameters are only visible if the DHCP mode is set to “Disable (static mode)”, see 6.2.2 Static IP Address (Manual) Settings.

Primary DNS Server

1 Select Network > Network A (B, C, or D).

2 In the Primary DNS field, enter the IP address for the primary DNS server.

Secondary DNS Server

1 Select Network > Network A (B, C, or D).

2 In the Secondary DNS field, enter the IP address for the secondary DNS server.

6.3 Network Settings

6.3.1 SSID

The SSID is the name of the network that the handset associates with.

1 Select Network > Network A (B, C, or D).

2 In the SSID field, enter system SSID.

Note that the SSID is case-sensitive.

6.3.2 Voice Power Save Mode

The voice power save mode is used during calls. NONE is recommended to obtain optimal voice quality. U-APSD uses less power but is more sensitive to network disturbances.

If supported by the infrastructure, U-APSD is the preferred choice and multiples the talk time by more than 4 times compared to the NONE mode.

1 Select Network > Network A (B, C, or D).

2 In the Voice power save mode drop-down list, select one of following:

- NONE
- U-APSD

6.3.3 World Mode Regulatory Domain

There is a set of regional rules for the world mode settings and the a-band that the handset complies with. The preferred and the default setting is “World mode (802.11d)”. The handset gets its regulatory settings from the AP. If this is not supported by the AP, then this has to be set in the handset as follows:

1 Select Network > Network A (B, C, or D).

2 In the World mode regulatory domain drop-down list, select one of the following:

- World mode (802.11d) (default)
- ETSI
- Japan
- USA

6.3.4 Radio and Channel Selection

The handset supports the 802.11a/n radio and 802.11b/g/n radio, but it cannot use the 802.11a/n radio and the 802.11b/g/n radio simultaneously. The radio defines the channels that can be used.

802.11 a/n Channels

Defines which 802.11a/n channels to use. It is recommended to use the value “UNII-1“. Select “Advanced“ only if the channels are to be set in the Advanced: 802.11 channels parameter, see Advanced: 802.11 Channels on page 33.

1 Select Network > Network A (B, C, or D).

2 In the 802.11 protocol drop-down list, select “802.11a/n“.

3 In the 802.11a/n channels drop-down list, select one of the following:

NOTE: The selected World Mode Regulatory Domain defines which channels to be used. See Bands and Channels used by WiFi a-radio.

- All
- Non DFS
- UNII-1
- UNII-3
- UNII-1, UNII-2
- UNII-1, UNII-2, UNII-3
- UNII-1, UNII-2, UNII-2 Extended
- Advanced

Bands and Channels used by WiFi a-radio

	Frequency band	Channels
Non DFS	5.150 - 5.250 MHz, 5.725 - 5.845 MHz	36,40,44,48 149,153,157,161, 165
UNII-1	5.150 - 5.250 MHz	36,40,44,48
UNII-2	5.250 - 5.350 MHz	52,56,60,64
UNII-2 Extended	5.470 - 5.725 MHz	100, 104, 108, 112,116, 120, 124, 128, 132, 126, 140
UNII-3	5.825 - 5.835 MHz	149,153,157,161

802.11 b/g/n Channels

Defines the 802.11b/g/n channels to use. It is recommended to use the default value “1,6,11“. If set to “All”, all channels are scanned for APs, which decreases the WLAN performance. Select “Advanced“ only if the channels are to be set in the parameter Advanced: 802.11 channels.

1 Select Network > Network A (B, C, or D).

2 In the 802.11 protocol drop-down list, select “802.11b/g/n“.

3 In the 802.11b/g/n channels drop-down list, select one of the following:

- All
- 1,6,11
- Advanced

Advanced: 802.11 Channels

Defines which 802.11 channels to use. Only used if the parameter in the 802.11b/g/n channels, or 802.11a/n channels is set to “Advanced“.

NOTE: It is not possible to scan channels in 802.11b/g/n and 802.11a/n simultaneously.

1 Select Network > Network A (B, C, or D).

2 Enter channels to scan in a comma-separated list, for example 1,6,11 (the order has no impact; 11,6,1 will give the same result).

6.3.5 Transmission Power

This is the transmission power the handset uses when transmitting data to the WLAN system. If “Automatic” (default) is used, the transmission power is adapted according to 802.11h, CCX or maximum possible.

1 Select Network > Network A (B, C, or D).

2 In the Transmission power drop-down list, select one of the following:

- Automatic
- 0 dBm
- 5 dBm
- 11 dBm
- 14 dBm
- 20 dBm (max)

6.3.6 IP DSCP for Voice/Signaling

Differentiated Services Code Point (DSCP) defines the value to use for outgoing voice and signaling traffic. The DSCP value is used for QoS on the LAN. The settings in the handset must agree with the settings in the system, otherwise it results in bad voice quality.

1 Select Network > Network A (B, C, or D).

2 In the IP DSCP for voice and/or IP DSCP for signaling drop-down list, select one of the following:

- 0x38 (56) - Class selector 7
- 0x30 (48) - Class selector 6
- 0x2E (46) - Expedited Forwarding (default for voice)
- 0x28 (40) - Class selector 5
- 0x20 (32) - Class selector 4
- 0x1A (26) - Assured forwarding 31 (default for signaling)
- 0x18 (24) - Class selector 3
- 0x10 (16) - Class selector 2
- 0x08 (8) - Class selector 1
- 0x00 (0) - Default

6.4 Security Settings

The WLAN system can be configured to use various encryption and/or authentication schemes. The use of extensive encryption/authentication schemes can cause incidents of dropped speech during handover due to the time to process the authentication.

The most used encryption and authentication modes are directly available from the Security mode drop-down menu. The most required parameters per mode are shown.

TIP: To view all available security parameters, use the “Advanced” menu.

6.4.1 Open

Select Open if no encryption/authentication is required. To select Open as the security mode, do the following:

1 Select Network > Network A (B, C, or D).

2 In the Security mode drop-down list, select “Open”.

6.4.2 WEP 64/128-bit Key

To use WEP64/128-bit Key as the security mode. Do the following:

1 Select Network > Network A (B, C, or D).

2 In the Security mode drop-down list, select “WEP64/128-bit Key”. Additional parameters can now be set. See below.

3 In the WEP key 1 field, enter the WEP key to be used.

4 In the WEP transmit key drop-down list, select “WEP key 1“.

6.4.3 WPA-PSK & WPA2-PSK

To select WPA-PSK & WPA2-PSK as the security mode. Do the following:

1 Select Network > Network A (B, C, or D).

2 In the Security mode drop-down list, select “WPA-PSK & WPA2-PSK”.

3 In the WPA-PSK passphrase field, enter the passphrase for WPA-PSK/& WPA2-PSK.

6.4.4 802.1X with EAP-FAST

To select EAP-FAST as the authentication method. Do the following:

1 Select Network > Network A (B, C, or D).

2 In the Security mode drop-down list., select “EAP-FAST”.

3 In the EAP authentication user name field, enter the user name for EAP authentication.

4 In the EAP authentication password field, enter the password for EAP authentication.

6.4.5 802.1X with PEAP-MSCHAPv2

PEAP-MSCHAPv2 requires the use of root certificates for authentication of the WLAN. To select PEAP-MSCHAPv2 as the authentication method, do the following:

1 Ensure that the handset is online in WinPDM.

2 For server validation import the root certificate by performing the following steps:

- In the Numbers tab, right-click the handset’s number and select “Manage certificates“. A Manage certificate window opens.
- In the Root tab, click “Browse“ and select the root certificates to import. Click “Close“.

3 Select Network > Network A (B, C, or D)

4 In the Security mode drop-down list, select “PEAP-MSCHAPv2”.

5 In the EAP authentication user name field, enter the user name for EAP authentication.

6 In the EAP authentication password field, enter the password for EAP authentication.

7 In the Validate server certificate field, select if validation of server certificate during authentication is to be disabled.

WARNING: By disabling the validation, the server is not authenticated and may be a rouge one.
Needed condition: The server must send his complete certificate chain. The sent CA-certificate must be equal with the saved root certificate at the WL3 handset.

6.4.6 EAP-TLS

EAP-TLS requires the use of (server) root certificate to authenticate the WLAN, and client certificates to present to the WLAN for client authentication. To select EAP-TLS as the authentication method, do the following:

1 Ensure that the handset is online in WinPDM.

2 Import the client certificate and for server validation import the root certificate by performing the following steps:

- In the Numbers tab, right-click the handset's number and select "Manage certificates". An Manage certificate window opens.
- In the Root tab and Client tab, click "Browse" and select the certificates to import. Click "Close".

3 Select Network > Network A (B, C, or D).

4 In the Security mode drop-down list, select "EAP-TLS".

5 In the EAP client certificate drop-down list, select the client certificate to use.

6 In the Validate server certificate field, select if validation of server certificate during authentication is to be disabled.

Warning: By disabling the validation, the server is not authenticated and may be a rouge one.
Needed condition: The server must send his complete certificate chain. The sent CA-certificate must be equal with the saved root certificate at the WL3 handset.

6.5 Handset Settings

This section describes specific settings for the handset that can be changed using the keypad on the handset, and/or can be set in the WinPDM/WSG to assist the user, or to set the initial value when the handset is commissioned.

General Settings	**Keypad**[a]	**WinPDM**
6.5.1 Automatic key lock on page 37	x	x
6.5.2 Phone lock on page 37	x	x
Headset type on page 38	x	x
6.5.5 Audio adjustment on page 38	x[b]	x
6.5.15 Shortcuts on page 42	x	x
6.6 Profiles on page 45	x	x
6.5.11 Battery Warning on page 41	x	x
6.5.7 Actions when the Handset is Placed in the Charger on page 39	x[b]	x
6.5.12 Shared Phone on page 41		x
Telephony		
6.10.8 Message Centre Number on page 59		x
6.10.9 Max number of Call Completions on page 59		x

6.10.10 Dial Pause Time on page 59		x
6.10.11 Direct off Hook from Charger on page 59	x	x
6.10.12 Replace Call Rejected with User Busy on page 59		x
6.10.6 Emergency Call Numbers on page 58		x
6.5.17 Import Contacts on page 44		x
6.5.18 Company Phonebook on page 44		x
6.5.19 Central Phonebook on page 45		x
6.10.7 Voice Mail Number on page 59		x
Regional Settings		
6.11.1 Set Time & Date on page 60	x	x
6.5.14 Select Default Language on page 42	x	x
6.11.3 Dialing Tone Pattern on page 62		x
Customize Menu		
6.5.13 Uploadable Language on page 42		x
6.13.1 Hide Menu Items on page 63		x
6.13.2 Services on page 63	x	x
Display		
6.12.1 User Display Text on page 62	x	x
6.12.3 Font style on page 62	x	x
6.12.4 Backlight Timeout on page 62		x
6.12.5 Brightness on page 62	x	x
6.12.6 Screen Saver on page 63	x	x
Messaging		
6.8 Messaging Settings on page 46	x[b]	x
Alarm		
6.9 Alarm Settings on page 53		x

a. Refer to the User Manual for more information on how the user can change the settings using the handset´s keypad.
b. Some parameters cannot be changed when using the keypad.

6.5.1 Automatic key lock

Turn on the automatic key lock to avoid unintentional key presses.

NOTE: If configured, it is possible to dial any of up to five predefined emergency numbers when the keypad is locked, see 6.10.6 Emergency Call Numbers on page 58.

1 Select Device > Settings.

2 In the Automatic key lock drop-down list, select one of the following:

- On - activates the automatic key lock, also during an ongoing call.
- Off - deactivates automatic key lock

6.5.2 Phone lock

Activate the phone lock to prevent unauthorized usage of the handset. A password is required to unlock the handset in order to access its functions.

NOTE: If configured, it is possible to dial any of up to five predefined emergency numbers when the handset is locked, see 6.10.6 Emergency Call Numbers on page 58. It is not recommended to use Phone Lock when using the Shared Phone feature, see 6.5.12 Shared Phone on page 41

1 Select Device > Settings.

2 In the Phone lock drop-down list, select one of the following:

- On - the handset will be locked after a few seconds when it is not used and a password is required to open it again
- On in charger - the handset is be locked when placed in charger.
- Off - the phone lock is not activated.

6.5.3 Automatic lock time

When either the key lock or the phone lock is set to On, the lock is activated after the specified time. It is possible to change the default time of 20 seconds.

1 Select Device > Settings.

2 In the Automatic lock time drop-down list, select desired time:

- 5, 10, 20, 30 seconds, 1, or 3 minutes.

6.5.4 Automatic key unlock

1 Select Device > Settings.

2 In the Automatic key unlock drop-down list, select one of the following:

- On - the handset keypad is locked up automatically at incoming calls and messages.
- Off - the handset is not locked up automatically to avoid unintentional key press

6.5.5 Audio adjustment

Select the volumes for the different audio signals in the handset.

1 Select Audio > Volume.

2 Select the appropriate volume type from the drop-down lists:

- Handsfree volume
- Headset volume
- Speaker volume

3 In the Persistent volume drop-down list, select “Enable” to automatically store volume changes in the handset for future calls.

The parameter affects the “Normal”, “Headset“, “Loudspeaking“ mode.

For selection of headset, see Headset type on page 38.

NOTE: Changing this parameter can result in lower sound quality and high sound level. Evaluate carefully before applying.

6.5.6 Headset Configuration

Headset type

Select the headset model that is used.

1 Select Headset > General.

2 Select the applicable item from the drop-down list:

IMPORTANT: Do not select “Hearing protection” unless a Peltor headset is used.

- Hearing protection
- Mic on boom
- Mic on cable
- User model (If none of the headsets above are selected, this option can be used to configure an own headset profile. If selected, additional configuration is required, see Headset user model)

Headset user model

These settings are required if User model is selected under Headset > General.

1 Select Headset > User model.

2 In the Name of headset field, enter a descriptive name. For example the headset model to be used.

3 In the following drop-down lists, select the applicable values for the headset:

- Microphone gain
- Speaker gain
- Side tone

NOTE: Changing the parameters can result in lower sound quality and high sound level. Evaluate carefully before applying.

Corded headset button

1 Select Headset > General.

2 In the Call with headset button list, select one of the following:

- Not activated – it is only possible to answer/end a call.
- Last called number – the last called number is dialled.
- Predefined number – a predefined number is called (if selected, continue with step 3)

3 If needed, in the Predefined number field, enter the number to be dialled when the headset button is pressed.

6.5.7 Actions when the Handset is Placed in the Charger

The behavior of the handset when it is placed in a charger can be configured.

In-charger action when not in call

1 Select Device > Settings.

2 In the In charger action drop-down list, select one of the following:

- No action - no action is performed when handset is placed in charger
- Switch off - the handset is switched off when placed in charger
- Sound off - the handset is silenced when placed in charger (except for messages with set “Break through” parameter, for example, “Prio 1” messages.)

NOTE: Messages with breakthrough (for example with high/alarm priority) are not muted. If you want to mute all messages (regardless of priority) also set the Device > Messaging > Show and indicate messages in charger > Off.

- Change profile (WL3 Plus only) - the handset changes profile when placed in charger.
  - In the Change profile in charger drop-down list, select the profile to be used.
  - If needed, configure the selected profile, see 6.6 Profiles.

3 In the In charger Message absent[1] drop-down list, select one of the following:

- No - messages are saved in the handset's messaging inbox while the handset is placed in a charger (default).
- Yes - if a message is sent from a system it is notified that the handset is absent. Messages are not sent to the handset.

Clear lists in charger

1 Select Device > General.

2 In the Clear lists in charger drop-down list, select one of the following:

- Yes - message lists and call lists are deleted when the handset is placed in the charger.
- No - no action is performed when the handset is placed in the charger.

Show and indicate messages in charger

Defines how incoming messages are displayed/indicated when the handset is placed in the charger.

NOTE: All incoming messages are affected by this setting: that is PTT invitation received as a message, and all other messages regardless of priority (even messages with breakthrough such as high/alarm priority). If you only want to silence messages without breakthrough (low/normal priority), set the Sound off parameter instead (in Device Settings > In charger action > Sound off).

1 Select Device > Messaging.

2 In the Show and indicate messages in charger drop-down list, select one of the following:

- On - Messages are shown and indicated (by beep) when the handset is placed in the charger (default)
- Off - The message alert (if any) is muted and only the New message icon is displayed. The messages are stored as unread messages in the Message inbox.

6.5.8 Hide Missed Call Window

By default, a Missed call window indicates a missed call. It is possible to hide this window, for example, if both a handset and a mobile is used. If the user answers the call using the mobile, the Missed call window is not displayed in the handset.

1 Select Device > Call.

2 In the Show missed calls popup drop-down list, select "No" to hide the Missed call window.

1. This function is applicable for WL3 Messenger Upgrade and WL3 Plus only.

6.5.9 Prevent Mute function

It is possible to prevent that the handset is muted/set to silent by a user.

1 Select Audio > General.

2 In the Prevent silent drop-down list, select one of the following:

- On - The user cannot set the handset to silent by using mute or decreasing the volume.
- Off - The user can mute/reduce the volume to silent in the handset (default).

6.5.10 Prevent Calls from being saved in the Call list

It is possible to prevent that the handset stores outgoing and incoming calls in the Call list. This can be useful to prevent that an unauthorized person views the call list.

1 Select Device > Call.

2 In the Enable call list drop-down list, select “Off” to prevent all calls being saved.

6.5.11 Battery Warning

1 Select Device > Settings

2 In the Battery warning drop-down list, select one of the following:

- Sound repeatedly
- Sound once
- Sound off

6.5.12 Shared Phone

This setting defines if the handset is personal or shared. The default setting is “No” but if “Yes” is selected, the handset can be used by several users. Each user can still have their individual settings and access them using personal login and a password (the password can be a common password for all users or the call number). To use the Shared phone functionality, the following is required:

- The handset does not use certificate.
- WSG

A handset that is personal can also use a shared password (empty or specific) from the WSG.

NOTE: If you accidentally enter a personal phone number in the shared handset, the handset becomes personal and cannot be used as a shared phone any longer. The handset must be configured to act as a shared phone again.

1 Select Device > General.

2 In the Phone mode drop-down list, select one of the following:

- Personal
- Shared

NOTE: When the setting is changed, the handset is automatically restarted.

6.5.13 Uploadable Language

It is possible to upload one additional language to the handset. The language file is generated through an Excel file. The Excel file used to generate language files is delivered from your supplier.

TIP: It is also possible to upload a language on several handsets of the same device type simultaneously using the Baseline function in the Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

If another language file is uploaded, the first additional language is overwritten.

Certain special characters are allowed when generating the language file, see information in the Excel file.

To upload an additional language, do as follows:

1 In the Devices tab, select the device(s) to be uploaded with additional language.

2 In the Device menu, select “Upload language...“.

3 If the uploaded language is to be used in the handset, see 6.5.14 Select Default Language for more information.

6.5.14 Select Default Language

Defines the default operating language for the handset. This setting can later be changed by the user.

1 Select Device > Settings.

2 In the Language drop-down list, select the language to be used.

3 If the downloaded language is selected, it might be needed to select matching characters as text input language, and the sort order in the phonebook

In the Input Language drop-down list, select the text input language to be used.

NOTE: This parameter is only applicable for the downloaded language and cannot be changed by the user.

6.5.15 Shortcuts

One click access to predefined functions can be configured for the Soft keys, Hot keys, Navigation keys, and the Multifunction button[1]. For example a Soft key can be configured to make a call.

Shortcuts are configured using parameters in the “Shortcuts” folder, except Soft keys, which are configured in the “User Profiles” folder.

NOTE: A hot key configured to Services with the function “Data send” is also available during a call.

TIP: It is also possible to configure shortcuts using the handset menu. See the User Manual of the handset.

Configure a Hot Key

A hot key is activated by pressing a preprogrammed button “0”, “2“ - “9” for more than 1 second in idle mode. For example, the hot key function is used, to change the profile, send a message, or make a phone call to a specific number.

1. The Multifunction button is applicable for WL3 and WL3 Messenger Upgrade only.

1 Select Shortcuts > Hot keys X (where X is 0, 2 - 9).
2 Continue with Additional Shortcut Settings on page 43.

Configure a Soft Key

NOTE: When programming Soft keys, both name and function must be set.

1 Select User Profiles > Normal/Profile X > Soft keys > Soft key X (where X is Left, Middle, or Right)
2 In the Soft key name field, enter the name of the soft key shortcut to be displayed in the handset.
3 Continue with Additional Shortcut Settings on page 43.

Configure a Navigation Key

1 Select Shortcuts > Navigation Key X (where X is Up, Down, Left, or Right)
2 Continue with Additional Shortcut Settings on page 43.

Configure the Multifunction Button[1]

1 Select Shortcuts > Multifunction Button X (where X is Longpress or Multipress)
2 Continue with Additional Shortcut Settings on page 43.

Additional Shortcut Settings

1 In the Function drop-down list, select the function to be used:
- Phone call
- Phone call “Loudspeaker mode”
- Call List
- Contact list
- Central phonebook (system dependent feature)
- Message inbox
- Send Message
- Change Profile Normal
- Change Profile X (1- 4). (If selecting profile 1-4, the profile must first be configured, see 6.6 Profiles on page 45.)
- Open Menu (Main menu, Calls, Call Services, Connections, Contacts, Messaging, Services, Profiles, Settings.)
- Executive Service X (1- 10) Services (Not applicable for WL3 Messaging)
- Logout (applicable for the Shared Phone feature)Call Diversions
- RSSI Measure

2 In the Value field, enter the applicable value. This is mandatory when using Phone call function.
3 In the Control Question drop-down list, select “Yes“ if the Proceed? window is displayed after the key is pressed. This is used to prevent a function being accessed by mistake.
4 In the Read Only drop-down list, select “True“ if the user is not able to change the shortcut.

1. Applicable to WL3 and WL3 Messaging only.

6.5.16 Soft Key Functions During Call

It is possible to configure the in-call functions for the left and right soft keys. The in-call functions are accessed by pressing the left or right soft key during a call.

1 Select Device > Call.

2 In the Left in call soft key name or Right in call soft key name field, enter the name of the soft key to be displayed during a call.

3 In the Left in call soft key action or Right in call soft key action drop-down list, select one of the following functions:

- Conference
- Contacts
- Messaging (if applicable)
- Disabled
- End Call
- Hold
- Loudspeaker
- New call (put active on hold)
- Retrieve
- Switch
- Transfer (to held call)
- Transfer to new call (blind transfer)

4 Select OK

6.5.17 Import Contacts

It is possible to import a phonebook file (that is, local phonebook) to a handset. The phonebook file is a tab-separated .txt file, and contains two items per row; number and name. The WinPDM/WSG is used to import the phonebook file to the handset. See Import Contacts in Installation and Operation Manual, Portable Device Manager, Windows version, TD 92712EN,Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

6.5.18 Company Phonebook

It is possible to create a phonebook that is administered centrally and uploaded to the handset from WinPDM/WSG. If this feature is used, entries from Contacts and Company Phonebook are merged. The Company Phonebook entries are locked and cannot be edited in the handset.

Perform the following steps:

1 Create a Company phonebook file, see Create a Company Phonebook File.

Import the Company phonebook file to WinPDM/WSG, see Installation and Operation Manual, Portable Device Manager, Windows version, TD 92712EN, or Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

Upload the company phonebook file to the handset(s), see Installation and Operation Manual, Portable Device Manager, Windows version, TD 92712EN, or Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

Create a Company Phonebook File

The company phonebook file (.cpb) is normally created from an Excel file using a script to extract the information and create the phonebook file (.cpb). The Excel file, “Company Phonebook.xls“ is delivered from your supplier.

The format of the rows in the phonebook file is:

<Name><tab><phone number><carriage return>

followed by additional rows for each entry.

The handset supports a maximum length of 24 characters in each field, additional characters are truncated when the phonebook file is created. The following characters are accepted in the handset number field in the phonebook file, but are ignored when the phonebook file is created: “(“, “)“, “-“ and “ “(space).

6.5.19 Central Phonebook

NOTE: This is a system dependent feature.

If the network is equipped with a messaging server with a phonebook service, the Central Phonebook on that server can be accessed from the handset.

1 Select Device > Message centre.

2 In the Central phonebook field, enter the number to the Central phonebook

The number to be used is set to default 999999. If the system is not equipped with a Central Phonebook, this menu option can be removed from the handset by entering an empty value.

6.6 Profiles

It is possible to set up an own profile for incoming calls, message alerts, vibrating alerts, key sound etc. This can be useful when there are many users on the same handset, and they want different sound profiles. It can also be used for temporary settings, for example while in a meeting, incoming calls should be silent.

Profiles are configured through parameters in the “User Profiles“ folder.

1 Select User Profiles > User Profiles X (where X represents the Norma profile (default) or Profile 1- 4).

2 The following settings for the profile can configured:

- Profile name
- Internal/External/Callback ring signal
- Ring volume
- Vibrator
- Key sound
- Message alert signal
- Diversion settings
- Answering settings
- Alarm settings

Diversions

Calls can be diverted to other phone numbers, for example when busy.

1 In the applicable profile, select Presence and diversion.

2 Activate a diversion by selecting “On” in the applicable diversion drop-down lists. The following diversions are possible:

- Activate diversion for all calls
- Activate diversion on user busy
- Activate diversion on no answer

3 Enter the diversion number in the applicable diversion number text field.

6.7 Messaging and Alarm

The messaging and alarm functions are provided through the WSG and described in the document Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG), TD 92442EN.

6.7.1 IP Address to the WSG

The WSG handles all communication between the WLAN and its built-in Centralized Device Manager. It is possible to send messages from a web browser to a handset, handle messages to groups, send simple messages from handset to handset (and to groups), search for telephone numbers in a central database (on PC), have a central telephone book on the WSG (not PC-based), and to provide absence handling in the system.

1 Select Device > WSG.

2 In the IP address field, enter the IP address of the WSG. If empty, no messaging or alarm function is available.

6.8 Messaging Settings

NOTE: Applicable to WL3 MessagingWL3 Plus only.

It is possible to configure how incoming messages are indicated and displayed in handset.

Profiles > Normal, Profile 1- 4

- Vibrator
  Defines if the handset vibrates when receiving incoming calls and messages.
- Message alert
  Defines the message sound for incoming messages.
- Message volume
  Defines the message volume for incoming messages. By default, the message volume follows the ringer volume, but a different message volume can be set with this parameter.

Device > Messaging

- Message list representation
  Can be set to text or number.
- Message text size
- Time to read (TTR)
  Defines if the user needs to close a message manually, or if the message automatically closes when the TTR expires. Regardless of how a message is closed, it is removed from the message queue and stored in the Messaging Inbox.

TTR starts when a message is displayed and continues to run when the message is placed in the messaging queue. If a user presses any key when a message is displayed, the TTR is reset. See also 6.8.2 Examples of TTR/TTP settings on page 50.

- Time to prioritize (TTP)

  Defines how long messages keep their priority status. The TTP starts when a message is displayed. If a user presses any key when a message is displayed, the TTP is reset. If receiving a message with higher priority than the displayed message, the message with lower priority is placed in queue and its TTP is paused. When the TTP elapses for a message, it is put last in the queue. See also 6.8.2 Examples of TTR/TTP settings on page 50.
- Repeat message indication

  This parameter enables/disables message indications. It sets whether a message indication is repeated until confirmed by the user or not. The current repetition rate is 7 seconds. If the message itself contains a repetition, it overrides this setting.
- Vibrator for message during call

  Defines if the handset vibrates when receiving messages during an ongoing call.
- Message alert during call

  Defines if a message alert should be played when receiving a message during a call.
- IM option mode

  This parameter is used for older applications and sets that three soft keys are placed automatically, i.e. on soft keys or in an option menu (list).
- Call priority

  This parameter defines:

  - whether call information presented on the display during an incoming, ongoing, and outgoing call is suppressed when viewing a message
  - whether an ongoing call is disconnected when receiving a PTT invitation with Answer mode set to “Automatically”.

  0 = Call indication overrides all messages and the ongoing call is never disconnected (default).

  1-9 = Comparison with message priority; highest priority is shown, and a PTT invitation with higher priority causes disconnection of ongoing call.

  10 = Call indication on the display is always suppressed and the ongoing call is always disconnected by a PTT invitation.

  The tables below show examples of priority settings and how they affect the handset’s behavior.

Call prio	*PTT invitation (prio)*[a]	*Disconnection of ongoing call?*
0	1	No, since this call priority setting overrides all PTT invitations regardless of priority.
6	6	No, an ongoing call is not disconnected when the priority is equal.
2	1	Yes, immediately since the PTT priority is set to 1 and is also higher than Call priority.
3	2	Yes, after 10 seconds since the PTT priority is higher than Call priority.

10	1	Yes, immediately since the PTT priority is set to 1 and also is higher than Call priority.
10	2	Yes, after 10 seconds since the PTT priority is higher than Call priority.

a. PTT invitation received as incoming call has always priority 6, while PTT invitation received as message can have priority 1 - 9 depending on configuration.

Table 2. Call prio vs PTT prio

Call prio	*Displayed Message (prio)*	*Call information suppressed?*
0	1	No, since this call priority setting overrides all messages regardless of priority.
7	6	Yes, since the priority of the displayed message is higher than the incoming call.
6	6	Yes, since the message is considered as most important when the priority is equal.
1	3	No, since the priority of the incoming call is higher than the displayed message.
10	1	Yes, the call information is always suppressed regardless of the message priority.

Table 3. Call prio vs Message prio

- Show and indicate messages in charger

  Defines if incoming messages are shown and indicated by a beep when the handset is placed in the charger.

NOTE: This affects all messages and priority levels (PTT invitation received as a message and messages with breakthrough such as high/alarm priority) including remote call setup. Messages are stored in the Messaging inbox.
TIP: If you only want to silence messages without breakthrough (low/normal priority), set the Sound off parameter instead (in Device > Settings > In charger action > Sound off).

Settings > Display

- Rotate display text

  Defines if incoming messages are displayed upside down. This can be useful if you wear the handset in a belt and want to read the message without rotating the handset. When pressing any key, the messages are displayed in the normal way.

  NOTE: This setting also affects how incoming calls are displayed.

6.8.1 Configure Message Alerts with Beep Codes

The handset can map beep codes sent from a system/an application to different message alerts. There are several ways to treat the beep codes:

TIP: To configure the same message alert for a group, make the settings in the WinPDM in Profiles > Normal/Profile X > Message alert. Save the settings as a template and add it to desired handsets.

TIP: Any of the default handset beeps (Beeps and Enhanced beeps) are customizable, see B.1 Customize the default handset beeps on page 87.

Beeps according to beep code

Beep code sent from a system/application	The handset plays:
Beep code 0	No message alert is played
Beep codes 1- 6	1 - 5, and 10 beeps
Beep code 7	Siren

The handset plays the original message alerts that are mapped to the beep codes.

1 Select Settings > Sound and Alert.

2 In the Message alert drop-down list, select "Beeps".

High beeps according to beep code

Beep code sent from a system/application	The handset plays:
Beep code 0	No message alert is played
Beep codes 1- 6	1 - 5, and 10 beeps
Beep code 7	Siren

The handset plays the message alerts that are mapped to beep codes, but with a higher pitch.

1 Select Settings > Sound and Alert.

2 In the Message alert drop-down list, select "High beeps".

Enhanced beeps according to beep code

Beep code sent from a system/application	The handset plays:
Beep code 0	No message alert is played
Beep codes 1 -3	1 - 3 beeps
Beep code 4	3 tones chime
Beep code 5	10 beeps
Beep code 6	Alarm sweep
Beep code 7	Siren

The handset plays extended message alerts that are mapped to the beep codes, but in the form of melodies.

1 Select Settings > Sound and Alert.

2 In the Message alert drop-down list, select “Enhanced beeps”.

Custom sounds according to beep code

The handset can play customized message alerts that are mapped to beep codes. The message alerts must first be customized and then mapped to the beep codes.

TIP: It is recommended to use this feature if you want to create a message alert that sounds like the equipment (for example a respirator) that generates an alarm. Also use custom sound, if it is desired to customize any of the default handset beeps (Beeps and

Enhanced beeps), see Appendix B: Programming Custom Sound on page 86.

Create Customized Sound

1 Select Settings > Custom Sounds > Custom Sound X (where X represent 1 - 10).

2 Set the following parameters:

- Label - The name of the custom sound (required). The name is visible when mapping the custom sound to a beep code later on.
- Melody - The text string represents a non-polyphonic sound. By default, example of melodies, which are based on Enhanced beeps, are set for Custom Sound 1 - 7, see Appendix B: Programming Custom Sound on page 86.
- Beat - The tempo in beats per minute to be used when playing the sound.
- Style - The ratio of note to rest period to be used when playing the sound.
- Instrument - The instrument to be used when playing the sound.

Map Beep Codes to Customized Sounds

1 Select Sound and Alerts > Custom Message Alert

2 In the Beep code drop-down lists, select the customized sounds to be used for respective beep codes.

Enable Customized Sound

1 Select Settings > Sound and Alert.

In the Message alert drop-down list, select “Custom sounds according to beep code”.

6.8.2 Examples of TTR/TTP settings

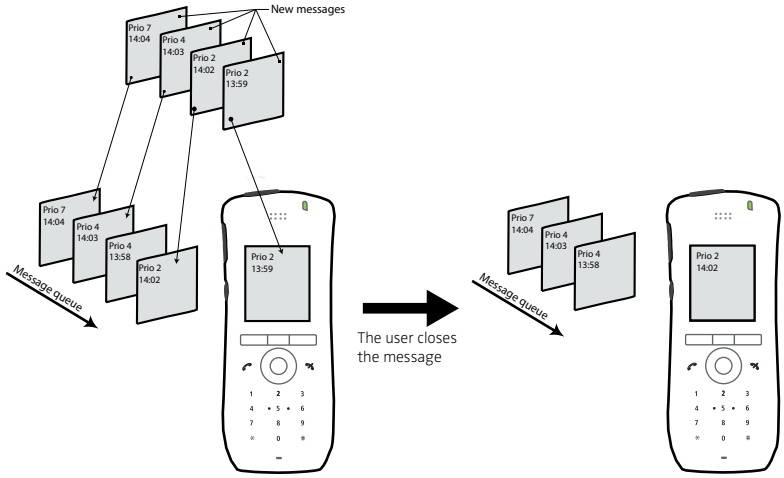
Example 1

This example describes the message handling with the following message settings:

- TTP= Prioritize forever
- TTR= Close manually

TIP: It is recommended to use these settings, if messages with the highest priority are always displayed until the user closes the current message.

Figure 4. How queuing and prioritizing for messages with equal messages works



In figure 4, a message with priority 2 is received at 13:59 and is displayed in the handset. Another message with equal priority is received at 14:02 and is placed in the queue. If no messages with higher priority are received, the user needs to close the currently displayed message to show the next message in the queue. In this case, the message received at 14:02. The closed message is indicated as a read message in the Messaging Inbox.

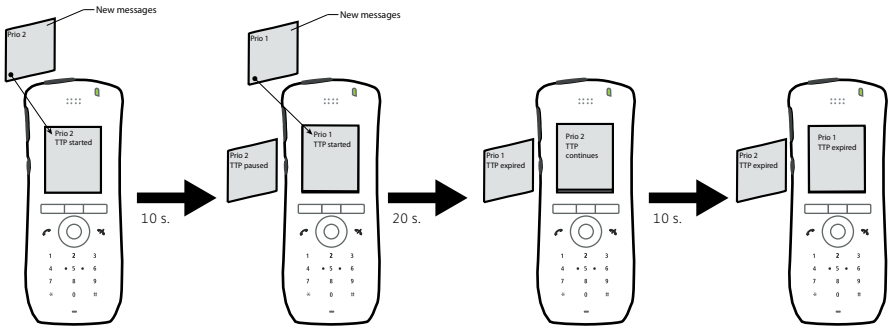
Example 2

This example describes the message handling with the following message settings:

- TTP= 20 seconds
- TTR= Close manually

TIP: It is recommended to use these settings if the user should not be interrupted for 20 seconds while reading a message, unless a message with higher priority is received. When the user has read a message, its priority is no longer important, and that is when the TTP expires.

Figure 5.



In figure 5, a message with prio 2 is received and displayed in the handset, and the TTP for the message is started.

After 10 seconds, a second message with priority 1 is received and displayed while the message with priority 2 is put in the queue. TTP for the message with priority 2 is paused, and TTP for the message with priority 1 is started.

After 20 seconds, TTP expires for the message with prio 1 and the message is placed in the queue. The message with priority 2 is shown again and its TTP continues.

TTP expires after 10 seconds for the message with priority 2. In this case, all messages have been shown for 20 seconds each, and the oldest shown message with the highest priority is displayed (in this case, the message with priority 1). The handset does not indicate when it shows the message again, since it already has been shown and indicated once. The message with priority 2 is placed in the queue.

Example 3

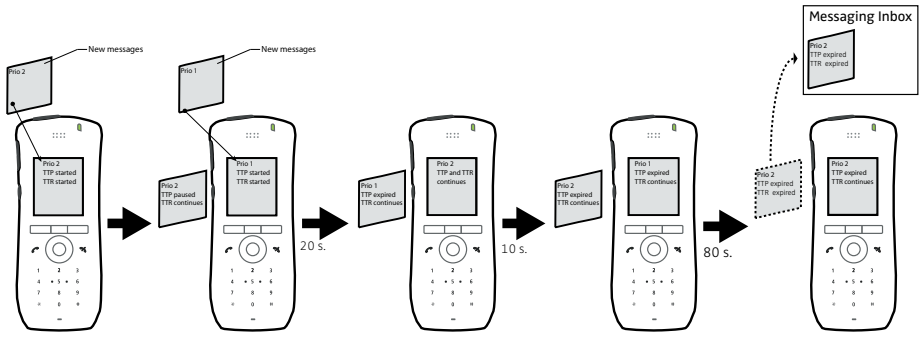
This example describes the message handling with the following message settings:

- TTP= 20 seconds
- TTR= 2 minutes

TIP: It is recommended to use these settings if the user shall not be interrupted for 20 seconds while reading a message, unless a message with higher priority is received. When the user has read a message, its priority is no longer important, that is when TTP

expires. In addition, if a message is not shown again within the TTR interval, it is considered as not important and is removed from the queue.

Figure 6. Message handling without manually closing a message.



In figure 6, a message with prio 2 is received and displayed in the handset. TTP and TTR for the message is started.

After 10 seconds, a second message with priority 1 is received and displayed while the message with priority 2 is put in the queue. TTP for the message with priority 2 is paused, but TTR continues. TTP and TTR for the message with priority 1 is started.

After 20 seconds, TTP expires but TTR continues for the message with prio 1 and the message is placed in the queue. The message with priority 2 is shown again and its TTP continues.

TTP expires after 10 seconds but TTR continues for the message with priority 2. In this case, all messages have been shown 20 seconds each, and the oldest shown message with the highest priority is displayed (in this case, the message with priority 1). The handset does not indicate when it shows the message again, since it already has been shown and indicated once. The message with priority 2 is placed in the queue.

After 80 seconds, the TTR expires for the message with priority 2, and it is removed from the queue and is indicated as an unread message in the Messaging Inbox. When TTR expires for the message with priority 1, it is also indicated as an unread message in the Messaging Inbox.

NOTE: If no messages have been read/closed manually and TTP expired for each message, a dialog window New message(s): [number of messages]. View now? is displayed. All messages are indicated as unread messages in the Messaging Inbox.

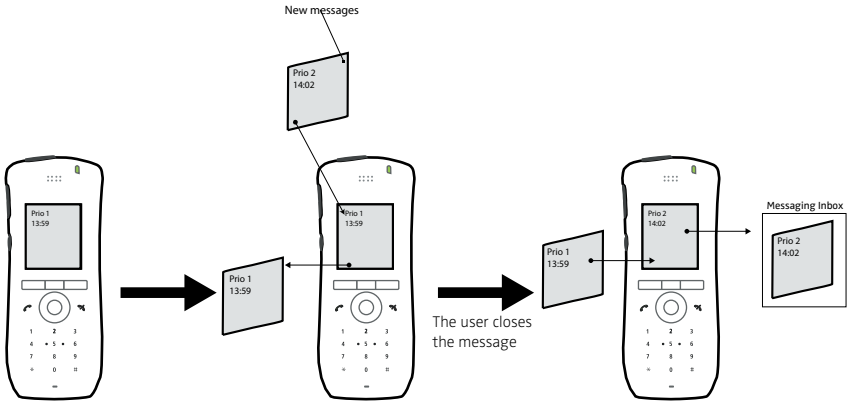
Example 4

This example describes the message handling with the following message settings:

- TTP= No prioritization
- TTR= Close manually

TIP: It is recommended to use these settings, if messages regardless of priority are read in chronological order, that is, the newest message is displayed first.

Figure 7. Display messages in chronological order regardless of priority



In figure 7, a message with priority 1 is received at 13:59. Another message with priority 2 is received at 14:02 and is displayed. The message with priority 1 is put in the message queue. The user needs to close the current message (priority 2) to show the message (priority 1) in the queue. When closing the message (priority 2) it is indicated as a read message in the Messaging Inbox.

6.9 Alarm Settings

NOTE: Applicable to WL3 Plus only.

The following alarm types can be configured; Push-button alarm, Test alarm, Emergency call alarm, Man-down and No-movement alarm.

6.9.1 Common Alarm Settings

These settings are common for all alarms sent from the handset.

1 Select Alarm > Common.

2 In the Stored alarm data field, enter data to be sent along with an alarm (optional).

3 In the Indicate initiated Alarm drop-down list, select one of the following:

- On - The handset will beep and the LED will flash twice when an alarm is initiated.
- Off - The handset will not indicate when an alarm is initiated.

4 In the Disable backlight during alarm drop-down list, select one of the following:

- Yes - The display backlight will be left unchanged for 30 seconds after alarm
- No - The display will light up after an alarm.

6.9.2 Push Button Alarm

NOTE: Applicable to WL3 Plus only.

1 Select “Alarm“.

2 Select “Multiple-press“ or “Long-press“.

3 In the Alarm type for multiple press drop-down list or Alarm type for long press drop-down list, select “Push button alarm 1“.

4 In the Number for automatic call after alarm field, enter the number to be called after an alarm has been activated (optional).

5 In the ALS drop-down list, select “Yes“ to define if a ramped up Acoustic Location Signal (ALS) sounds after pressing the alarm button.

6 In the Text indication for alarm on multiple press field or Text indication for alarm on long press, write the text to be shown in the handset display when the push-button is pressed. If this field is empty, the default text for long press “Test alarm” or for multiple press “Personal alarm” is shown.

7 In the Mode for automatic call after alarm drop-down list, select one of the following:

- Monitor - The loudspeaker is muted and the microphone is on.
- Loudspeaker - The loudspeaker is turned on.
- Ordinary - The loudspeaker is turned off.

6.9.3 Call Predefined Number without Sending Alarm

It is possible to use the push-button to automatically dial a predefined number without sending an alarm, that is, using the alarm button only to call a predefined number. The following example describes how to configure the push-button (alarm on long press). The corresponding settings can also be configured for the push-button when it is pressed twice or more (alarm on multiple press).

Example of configuration:

1 Select Alarm > Common

2 In the Number for automatic call after alarm field, enter the number to be dialed.

3 Select Alarm > Alarm on long press

4 In the Alarm type for long press drop-down list, select "Not used".

5 In the Mode for automatic call after alarm drop-down list, select one of the following:

- Normal: the call is established as an ordinary call.
- Loudspeaking: the loudspeaker on the backside of the handset is turned on.
- Monitoring: a one-way speech channel is established, that is, the called party can only listen to a conversation.

Information about the handset’s location can also be sent with an alarm, see 6.15 Location on page 65.

6.9.4 Test Alarm

1 Select “Alarm“.

2 Select “Multiple-press“ or “Long-press“.

3 In the Alarm type for multiple press drop-down list or Alarm type for long press drop-down list, select “Test alarm“.

4 In the Number for automatic call after alarm field, enter the number to be called after an alarm has been activated (optional).

5 In the ALS drop-down list, select “Yes“ to define if a ramped ALS sounds after pressing the alarm button.

6 In the Text indication for alarm on multiple press field or Text indication for alarm on long press, enter the text to be displayed in the handset when the alarm has been activated.

7 In the Mode for automatic call after alarm drop-down list, select one of the following:

- Monitor - The loudspeaker is muted and the microphone is on.
- Loudspeaker - The loudspeaker is turned on.
- Ordinary - The loudspeaker is turned off.

6.9.5 Man-down and No-movement Alarm

NOTE: Applicable to WL3 Plus only.

The following parameters are available in the WinPDM and Device Manager:

Table 4.

Parameter name	Description	Value {default}
Man-down and No-movement alarm license	Enables the alarm.	No/Yes {No}
Man-down alarm	Enables or disables the alarm.	Enabled/Disabled {Disabled}
Man-down detection time	Delay before the alarm is activated.	5–255 s {7}
Man-down warning angle	The handset tilt from the vertical at which the alarm is activated.	45, 60 {45}
No-movement alarm	Enables or disables the alarm.	Enabled/Disabled {Disabled}
No-movement detection time	Delay before the alarm is activated.	5–255 s {30}
Warning phase duration	Delay before the activated alarm is sent.	1–255 s {7}
NM-MD extra delay used	Enables or disables the possibility of an extra delay.	Yes/No {No}
NM-MD extra delay time	Extra delay before the alarm is sent.	1–20 min {10}
ALS	Enables or disables the ramped up ALS after the alarm has been sent. NOTE: The ALS is not triggered if the parameter “Automatic call after alarm” or “Silent alarm” is active.	Yes/No {No}
Mode for automatic call after alarm	Off: no automatic call after alarm. Normal: the call is established as an ordinary call. Loudspeaker: the loudspeaker on the backside of the handset is turned on. Monitoring: a one-way speech channel is established, that is, the called part can only listen to an conversation.	Off, Normal, Loudspeaker, Monitoring {Off}
Turn off NM-MD during call	Enables or disables alarms during a call.	Yes/No {No}

6.10 Telephony

The following parameters are required for the basic telephony settings.

6.10.1 Endpoint ID and Endpoint number

The Endpoint ID and Endpoint number are automatically received when registering the handset in the VoWiFi system. The Endpoint ID is normally the user's name registered in the PBX and is displayed in the handset in the idle mode. To change the name displayed in the handset, see 6.12.1 User Display Text on page 62.

NOTE: If the Endpoint ID needs to be changed, this must also be done in the PBX.

6.10.2 VoIP Protocol

A protocol is a set of standard rules for data traffic required to send information over a communication channel. Communication protocol is basically following certain rules so that the system works properly.

1 Select VOIP > General.

2 In the VoIP protocol drop-down list, select "SIP".

3 Continue with section SIP Protocol.

SIP Protocol

The following SIP protocol parameters are located under VoIP > SIP:

- SIP Transport – defines the protocol (UDP, TCP or TLS) to use for SIP signaling. The TLS setting requires the CA-certificate of the PBX certificate* to be uploaded as root certificate. It is also possible to turn off the validation of the server certificate, if set to "No".
  * Needed condition: The server must send his complete certificate chain.
- Outbound proxy mode – Set to "Yes" if the handsets are to connect with the SIP proxy through an outbound proxy. Set to "No" if the handsets are to connect directly with the SIP proxy (there may be two).
- Primary SIP proxy – defines the primary SIP proxy by either an IP address, a domain name, or an IP address together with a port number.

  Examples of valid formats are:
  192.168.1.1
  proxy1.mydomain.com
  192.168.1.1:5060

  Domain names are resolved using DNS records, and refer either to a DNS A record (address record) or a DNS SRV record (service record). While an A record is a single IP address, a SRV record originates from multiple A records, of which the handset tries the two highest prioritized IP addresses it receives in the DNS response when it registers with the primary SIP proxy.
  NOTE: Only a plain IP address is shown in the handsets Admin menu (under VoIP > Protocol > SIP > SIP proxy IP address).

  If the handset fails to register with the primary SIP proxy, it can register with the optional secondary SIP proxy.
  NOTE: The parameter is only visible, if the parameter Outbound Proxy mode is set to "No".

- Secondary SIP proxy – defines the optional secondary SIP proxy, which is used if the handset fails to register with the primary SIP proxy. See definition examples in Primary SIP proxy above.

  When the handset has connected to the Secondary SIP proxy, it continuously tries to reconnect to the Primary SIP proxy.
- Outbound proxy – defines the primary outbound proxy by a domain name, an IP address, or an IP address together with a port number. The parameter is only visible, if the parameter Outbound Proxy mode is set to “Yes”.
- Listening port – the port that the handset listens to for incoming SIP traffic.
- SIP proxy ID – defines the SIP proxy by a domain name.

  NOTE: This parameter is only needed when an outbound proxy is defined. It can also be used to specify a domain name when parameters Primary SIP proxy and Secondary SIP proxy have been assigned IP-addresses.
- SIP proxy password
- Send DTMF using RFC 2833 or SIP INFO – this parameter defines the path the DTMF signaling should take. If set to “RFC 2833“, the DTMF signaling is sent in the RTP stream, that is, from handset to handset. If set to “SIP INFO”, the DTMF signaling is sent using SIP signaling, that is, through the PBX.
- Hold type – defines type of hold to send when the handset puts a call on hold. The selection depends on what types of hold the PBX support. For more information about what types of hold the PBX support, see the applicable documentation for the PBX.
- Registration identity – defines if the endpoint uses its number or ID for the registration with the SIP proxy.
- Authentication identity – defines if the endpoint uses its number or ID for the authentication with the SIP proxy.
- MOH locally – Music on hold is played by the handset i.e. if the PBX does not supply MOH, the handset plays a tone when the call is on hold.
- Hold on transfer – puts a second call on hold before transfer, which is required by some SIP proxy servers.
- Direct signaling – defines whether calls originating from other sources than the configured SIP Proxy should be accepted or redirected using “USE PROXY“ message.
- SIP Register Expiration - defines the number of seconds for register expiration to the PBX.

6.10.3 Codec

A codec encodes a stream or signal for transmission. Codecs are often used in streaming media applications. This setting defines how to packetize and compress the sound in a voice call.

1 Select VoIP > General.

2 In the Codec configuration drop-down list, select the applicable codec. The following are possible:

- G.711 A-law (EU)
- G.711 u-law (US)
- G.729
- G.729A
- G.722

3 In the Codec packetization time configuration drop-down list, select packetization time to use for speech (value between 10 and 60 ms). Default value is 20 ms.

6.10.4 Offer Secure RTP

When enabled, voice is sent over Secure RTP, if the other party also supports Secure RTP.

SIP Protocol

1 Set parameter VoIP > SIP > SIP Transport to “TLS“.

2 Set parameter VoIP > General > Offer Secure RTP to “Yes“.

3 Select the preferred SRTP encryption by assigning a value to parameter VoIP > General > Secure RTP Crypto, which appears when enabling Secure RTP.

A padlock icon up left in the handset display indicates either a secure call (locked padlock) or a non-secure call (crossed padlock). Note that the relevant padlock icon only appears if both “TLS” (encrypted signalling), and “Offer Secure RTP > Yes” is set.

6.10.5 Internal Call Number Length

Defines the maximum number of digits to be interpreted as an internal call. “0“ means the same number of digits as in the endpoint number.

1 Select VoIP > General.

2 In the Internal call number length field, enter the number of digits.

6.10.6 Emergency Call Numbers

Up to five different phone numbers can be reserved for emergency calls. These numbers can always be called even when the phone- or key locks are active.

NOTE: If emergency numbers of varying length are used, care must be taken to ensure that longer numbers do not begin with the same digits and ordering used by a shorter number. For example, if 124 and 1245 define two emergency numbers, the number 1245 cannot be used, because 124 is always evaluated and called before the longer number. However, 5421 and 1256 is, for example, allowed.

1 Select Device > Call.

2 In the Emergency call Numbers field, enter the desired emergency number(s).

3 Select Alarm[1] > Emergency call.

4 In the Emergency call alarm drop-down list, select one of the following:

- On - An alarm is sent when the user calls the emergency number.
- Off - No alarm is sent when the user calls the emergency number.

5 In the Alarm type text field, write the text to be shown in the handset display when an emergency call is made. If this field is empty, the default text “Emergency call alarm” is shown.

Emergency Ring Signal

A separate ring signal for incoming emergency callback calls can be configured in the WinPDM. It is used to distinguish the emergency ring signal from other handset ring signals. When an emergency call is made from the handset, it first goes to a emergency center which in turn switches the call to the appropriate emergency service.

1. This function is applicable for WL3 Plus only.

This local emergency service then calls back to the handset user, who can identify the incoming call by this specific callback emergency ring signal.

1 Select Audio > General.

2 In the Emergency ring signal field, choose the ring signal for incoming emergency callback calls.

6.10.7 Voice Mail Number

In some systems it is needed to assign the handset number of the Voice Mail service.

1 Select Device > Message centre.

2 In the Voice mail number field, enter the number to the handset's voice mail inbox.

6.10.8 Message Centre Number

Specifies the number for the server responsible for Message Waiting Indication (MWI), if included in the system.

1 Select Device > Message centre.

2 In the Message Centre number field, enter the number for the server.

NOTE: The Voice mail call clears MWI drop-down list is not used.

6.10.9 Max number of Call Completions

Specifies the maximum number of call back requests the handset can handle.

1 Select Device > Call.

2 In the Max number of call completions drop-down list, enter the number of calls

6.10.10 Dial Pause Time

By adding a "P" to a phone number, a pause is added and is activated when dialing. For how long time it is activated, is also defined here.

1 Select Device > Call.

2 In the Dial pause time field, enter a pause time between 1 - 3 seconds.

6.10.11 Direct off Hook from Charger

The handset automatically answers a call (that is; quick answer) when removed from the charger.

1 Select Device > General.

2 In the Direct off hook from charger drop-down list, select "Enable".

6.10.12 Replace Call Rejected with User Busy

Is used if the system does not support call rejected.

1 Select Device > General.

2 In the Replace Call Rejected with User Busy drop-down list, select "Enable".

6.10.13 Call waiting behavior

The default behavior is to indicate “call waiting” to the user. It is possible to change this behavior so that the next incoming call is rejected, and a busy indication is sent back to the SIP proxy.

1 Select Device > Call.

2 In the Call waiting behavior drop-down list, select one of the following:

- Call waiting indication - The call is usually indicated by a short two-beep tone and an “Incoming call” dialog window in the handset display.
- Reject call - The call is automatically rejected (No beep tone or dialog window occurs).

6.10.14 Calling Line Identification Restriction (CLIR)

The handset can be configured to hide the calling number and name to the called party.

NOTE: Even if CLIR is enabled, there is an override function available to authorities, such as the police, that allows the caller identity to be seen, even if CLIR is enabled.

1 Select Device > Call.

2 In the CLIR (Calling Line Identification Restriction) drop-down list, select “On”.

6.11 Regional Settings

This section includes settings suitable for a specific region or country.

6.11.1 Set Time & Date

1 Select Device > General.

2 In the Time zone drop-down list, select the applicable time zone.

3 If the time zone “Other” is selected, a string must be entered in the Time zone string field to define the time zone.

For time zone format, see:

http://pubs.opengroup.org/onlinepubs/009695399/basedefs/xbd_chap08.html

For time zones, see:

http://www.timeanddate.com

NOTE: Only unquoted format is supported.

Enter the time zone string if automatically update for summer/winter is desired:

<String = StdOffset [Dst[Offset], Date/Time, Date/Time]>

- Std = Time zone (for example EST for Eastern Standard Time).
- Offset = time difference between the timezone and the UTC (Universal Time Coordinator).
- Dst = summertime zone (for example EDT for Eastern Daylight Time).
- Second Offset = time difference between the summer time and the UTC.
- Date/ Time, Date/ Time = beginning and end of summertime.
  - date format = Mm.n.d (d day of n week in the m month)
  - time format = hh:mm:ss in 24-hour format.

Note that a week always starts on a Sunday and the number for Sunday is 0.

Example:

North Carolina is located in the Eastern Time Zone. Eastern Standard Time (EST) is 5 hours behind UTC (StdOffset = EST5), the Eastern Daylight Time (EDT) is 4 hours behind UTC (DstOffset = EDT4). Summertime for the year 2013 begins at two a clock, on a Sunday, the second week in March (M3.2.0/2). The summertime ends at two a clock, on a Sunday, the first week in November (M11.1.0/2).

<String = EST5EDT4,M3.2.0/2,M11.1.0/2>

4 In the NTP server field, enter the address to the time server. If not set, the IP PBX address is used.

5 Select Device > Settings.

6 In the Time format drop-down list, select the applicable time format:

12h (for example 11:59 am/pm)
24h (for example 23:59)

7 In the Date format drop-down list, select the applicable date format:

DD/MM/YYYY, for example, 31/01/2010 (also called Europe)
MM/DD/YYYY, for example, 01/31/2010 (also called US)
YYYY-MM-DD, for example, 2010-01-31 (ISO 8601)
MMM DD YYYY, for example, Jan 31 2010
DD MMM YY, for example, 31 Jan 10
DD.MM.YYYY, for example, 31.01.2010
DD-MM-YYYY, for example, 31-01-2010

6.11.2 Select Default Language

Defines the default operating language for the handset. This setting can later be changed by the user.

1 Select Device > Settings.

2 In the Language drop-down list, select the language to be used.

3 If the downloaded language is selected, it might be needed to select matching characters as text input language, and the sort order in the phonebook

In the Input Language drop-down list, select the text input language to be used.

NOTE: This parameter is only applicable for the downloaded language and cannot be changed by the user. See 6.5.13 Uploadable Language on page 42 for more information.

6.11.3 Dialing Tone Pattern

Defines the tone pattern to use when dialing.

1 Select Audio > General.

2 In the Dialing tone pattern drop-down list, select the applicable region.

6.12 Display

6.12.1 User Display Text

Defines the text to be shown in the display in idle mode instead of the endpoint ID. If nothing is entered in this text field, the endpoint ID is displayed.

1 Select Device > Settings.

2 In the User display text field, enter the text to be displayed.

6.12.2 Rotate Display Text

The handset can be configured to show the contents of the display (except the soft key bar) upside-down at incoming calls or messages.

1 Select Device > Settings > Display.

2 In the Rotate display text list, choose Normal or Inverted.

6.12.3 Font style

The display font style can be changed to bold for increased readability.

1 Select Device > Settings.

2 In the Font style list, choose Normal or Bold.

6.12.4 Backlight Timeout

Numbers of seconds before the backlight is turned off.

1 Select Device > General.

2 In the Backlight timeout field, enter number of seconds before the backlight is turned off when handset is in idle mode.

6.12.5 Brightness

1 Select Device > Settings.

2 In the Brightness drop-down list, select one of the following:
- Normal - maximum backlight is used.
- Power save - reduced backlight is used.

6.12.6 Screen Saver

1 Select Device > Settings.

2 In the Screen saver drop-down list, select one of the following:
- Information - time and status is shown on the screen saver.
- Black - no information is shown on the screen saver.
- Black also in call - the “Black” screen saver (with no information) is shown also during phone calls.

NOTE: It is recommended to only use the screen saver setting “Black also in call”, when extended battery life is needed. Use also other screen saver settings than “Black also in call” if the handset needs to be set to silent (muted).

6.13 Menu Operation

6.13.1 Hide Menu Items

It is possible to hide menu items for the users. To hide or show a menu item, do the following:

1 Select Customization > Visibility.

2 Select “Hide”, “Show”, or “Read only“ for the applicable menu item in the drop-down list. If “Read only“ is selected, the menu item is visible in the handset, but cannot be edited by the user. The following items can be hidden:
- Connections (Network, Headset etc.)
- Calls
- Contacts
- Shortcuts (Soft keys, Hot keys etc.)
- Messaging
- Services (only WL3 Plus)
- Profiles
- Settings (Sounds, Display, Language etc.)

6.13.2 Services

NOTE: Applicable to WL3 Plus only.

It is possible to configure up to ten services that can be accessed from the handset’s Services menu.

1 Select “Services“.

2 Select between 1 - 10.

3 In the Service name, enter the name of the service to be displayed in the handset’s Service menu.

4 Select the service to be used:
- Phone Call
- Send a message to predefined number (prompt for the message text)
- Send data to message service centre (predefined data and/or prompt for the data)
- Edit alarm data
- PTT

5 In the Service user data field, enter the data to be sent/dialed when using the service.

NOTE: This field is not applicable for PTT.

6 In the Service prefix for user data field, enter the prefix for the service user data (if needed).

7 In the Service index field, enter the corresponding index used for PTT. For example, if PTT group 1 is configured (located under Push-To-Talk > **1**), the service index must be set to **1**.

NOTE: This field is only applicable for PTT.

If the PTT is not configured, continue, with 6.14 Push-To-Talk (PTT) Group Call.

TIP: It is also possible to configure soft keys to reach services quickly, see 6.5.15 Shortcuts on page 42.

6.14 Push-To-Talk (PTT) Group Call

NOTE: Applicable for WL3 Plus only.

To be able to configure a PTT session, the following must be known:

- The number to the PTT group (defined in the WSG)
- The PTT group numbers in OSCAR
- The phone number to the conference bridge

TIP: For more information about the PTT function, see also Function Description, Ascom VoWiFi System for Siemens, TD 92947EN or User Manual, WL3 WLAN Handset and WL3 Plus WLAN Handset, TD 92929EN.

NOTE: If Music on Hold (MOH) is used in the system, it can affect an ongoing PTT group call. If someone in the group conference answers another incoming call, MOH is played for the whole group.

1 Configure the PTT group in OSCAR.

2 Open the WinPDM. Select Push-To-Talk > X (where X represents 1-10).

3 In the Session name field, enter a name to identify the PTT session.

4 In the Group number field, enter the number for the PTT conference group.

5 In the Display text field, enter the text to be shown in the display during the PTT session.

6 In the PTT session signal drop-down list, select the indication of the PTT session.

7 In the Conference number field, enter the phone number to the conference bridge.

8 In the Answer mode drop-down list, select the answer mode for the PTT session.

9 In the Speaker mode drop-down list, select the speaker mode for the PTT session.

10 If it is desired to have the automatic key lock on during an ongoing call, select Device> Settings. In the Automatic key lock drop-down list, change the automatic key lock setting to “On”, see 6.5.1 Automatic key lock on page 37 and 6.5.3 Automatic lock time on page 38.

11 A Service must be configured to access the PTT session from the handset. If not configured, continue with 6.13.2 Services.

6.15 Location

NOTE: Applicable to WL3 Plus only.

Two types of location are supported, either a basic location solution that gives an approximate location using Access Point (AP) location, or a personal security solution that gives a more accurate location using a third-party Real-Time Location System (RTLS) solution.

The following RTLS solutions are supported:

- Cisco RTLS Solution

  To use the Cisco RTLS solution, use a Cisco Mobility Services Engine and the handset must also be configured.
- Ekahau RTLS Solution

  To use the Ekahau RTLS solution, the handset must have the Ekahau license (see 5.1.7 Upgrade Handset Functionality using License on page 20) and the handset must also be configured.

6.15.1 Configure Handset for Cisco/Ekahau RTLS Solution

1 Select Location > Common.

2 In the Location scanning drop-down list, select “Enable“.

3 In the Scanning interval[1] field, set the time between the scanning periods.

4 In the Scans per scanning period[1] drop-down list, select how many scans that should be performed during each scanning period.

If the Ekahau RTLS solution is used, also perform the steps 5 - 8.

5 Select Location > Ekahau.

6 In the EKAHAU license drop-down list, select “Yes“. Additional parameters are shown.

7 In the IP address field, enter the IP address for the Ekahau location appliance.

8 In the Listening port field, enter the port that the location appliance is listening to.

1. Note that close scanning periods, and frequently scans per period, will shorten the battery time.

7. Use Handset to Verify the VoWiFi System Deployment

7.1 Site Survey Tool

It is recommended to do site surveys with the built-in tools in the handset.

This provides a true measurement of the RF environment based upon the radio of the handset. Wireless analyzers can be used to provide additional assistance during a site survey.

7.2 Scan the Channels

To be able to use the site survey functions in the handset, configure the site survey functions correctly.

Default configuration for the handset is to use channels 1, 6, and 11. If the handset is intended for site survey use, scanning all channels is limited to 1, 6, and 11.

The table is upgraded regularly, starting with scanning channel 1, then 6 and finally 11. In between, the handset is in sleeping mode. The handset consults this table when making roaming decisions.

It is possible to scan all 802.11b/g/n channels, or scan all 802.11a/n channels by setting the parameter 802.11b/g/n channels or 802.11a/n channels to “All”, respectively.

For 802.11b/g/n channels, it is strongly recommended to set back the handset to “1,6,11” before normal use. For 802.11a/n channels, it is strongly recommended to set back the handset to “UNII-1” before normal use.

The World mode regulatory domain will also affect which channels that can be used. To scan channels 1-11 it is recommended that the handset is configured so the “World mode regulatory domain” parameter is set to “USA”. If scanning of channels 12 and 13 is also of interest use value “ETSI”.

There are two ways of scanning channels:

- Scan all channels
- Scan a specific channel

7.2.1 Scan all Channels

This gives a filtered list of the channels in the SSID found during the scan.

1 There are two options to access the Site Survey Tool menu:
   - If the handset has been factory reset or not configured; in idle mode, enter “40022“, select “Site survey tool“.
   - If the handset has been configured; in idle mode, enter “*#77#”.

2 Select “Scan all channels”.

3 Select the SSID to display the associated AP.

4 Select an AP to display information such as SSID, Channel, MAC address, Beacon period, QoS, and Privacy.

7.2.2 Scan a Specific Channel

This gives a list of all the APs found on that channel in the specified SSID.

1 There are two options to access the Site Survey Tool menu:
   - If the handset has been factory reset or not configured; in idle mode, enter “40022“, select “Site survey tool“.
   - If the handset has been configured; in idle mode, enter “*#77#”.
2 Select “Scan selected channel“.
3 Enter the channel to be scanned.
4 Select an AP to display information such as SSID, Channel, MAC address, Beacon period, QoS, and Privacy.

7.3 Range Beep

The range beep function enables a beep to be played whenever the handset experiences a filtered field strength of below the configured value (default -70 dBm) from the currently associated AP. Sudden drops in field strength caused by the environment are delayed because the value of field strength is filtered. For example walking through a door into a room. Thus it is important to walk slowly through the site to cover all weak spots.

7.3.1 Configurable RSSI Threshold

The RSSI threshold of the handset is set to -70 dBm (default). In the site survey menu there is the possibility to change the RSSI threshold. This is useful if a specific area is designed to have another coverage level than -70 dBm.

1 There are two options to access the Site Survey Tool menu:
   - If the handset has been factory reset or not configured; in idle mode, enter “40022“, select “Site survey tool“.
   - If the handset has been configured; in idle mode, enter “*#77#”.
2 Select “Range beep level”.
3 Enter the new RSSI threshold and press “OK”.

7.3.2 Range Beep on a Configurable RSSI Threshold

A beep is played when the signal goes below the selected threshold.

1 There are two options to access the Site Survey Tool menu:
   - If the handset has been factory reset or not configured; in idle mode, enter “40022“, select “Site survey tool“.
   - If the handset has been configured; in idle mode, enter “*#77#”.
2 Select “Range beep“.
3 Select one of the following:
   - On - Activates the range beeps
   - Off - Deactivates the range beeps

7.4 Location Survey

The location survey function makes it possible to use Site survey mode for Ekahau that causes location scanning to be performed at shorter intervals: 1s.

1 There are two options to access the Site Survey Tool menu:
   - If the handset has been factory reset or not configured; in idle mode, enter “40022“, select “Site survey tool“.
   - If the handset has been configured; in idle mode, enter “*#77#”.
2 Select “Location survey“
3 Select one of the following:
   - On - Activates the location survey
   - Off - Deactivates the location survey

8. Handset Internal Web Administration Page

The internal web administration page for the handset makes it possible to:

- View general information about a handset
- Troubleshoot the VoWiFi System.
- View statistics

8.1 Access the Handset´s Internal Web Administration page

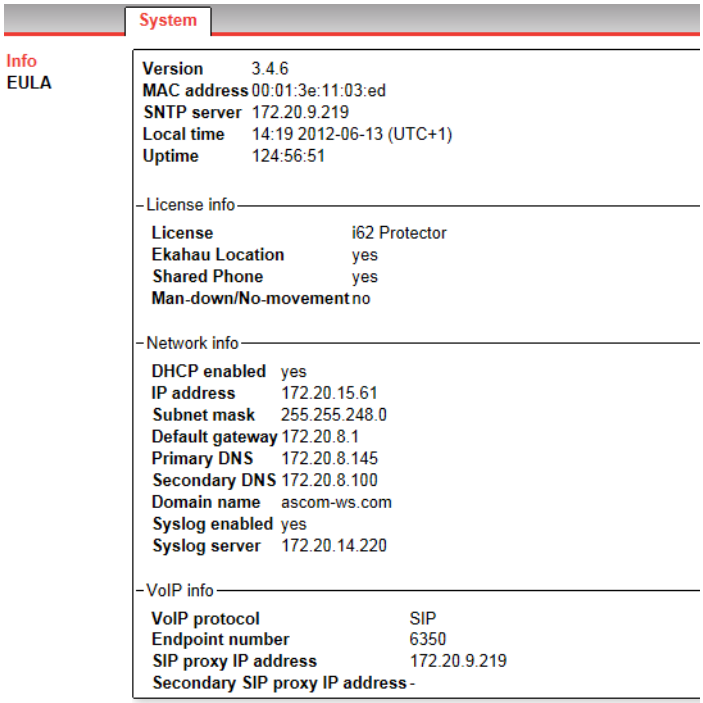
In a web browser, enter the handset´s IP address to access the internal web administration page for the handset. The IP address can be found in the handset´s menu (Settings >Device info >Network info).

8.1.1 General View

In the “System” tab, the following information is displayed:

- Software version
- MAC address
- SNTP server
- Local time
- Uptime
- License information
- Network information
- VoIP information
- SIP proxyIP address
- End User License Agreement (EULA).

Figure 8. Internal Web Administration Page



Enter administration user name and administration password to access further pages.

Default user name and password for an administrator:

- User name: admin
- Password: changeme

NOTE: If the user name or password is forgotten, it can be changed in the WinPDM. See 1 Open the WinPDM. on page 70.

8.1.2 Troubleshoot View

1 In a web browser, enter the handset´s IP address to access the internal web administration page for the handset. The IP address can be found in the handset´s menu (Settings >Device info >Network info).

2 Click on “Troubleshoot“.

3 If needed, enter administration user name and administration password to access further pages.

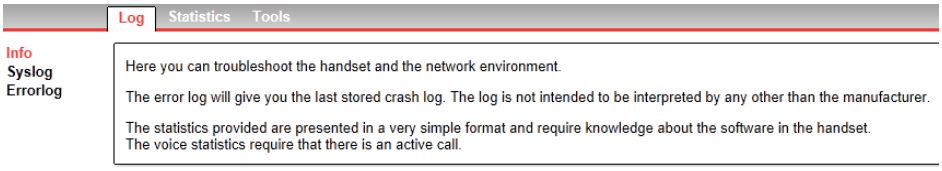
Default user name and password for an administrator:

- User name: admin
- Password: changeme

In the “Log”, “Statistics” and “Tools” Tab, the following information is available (see figure 9):

- Syslog
- Errorlog
- Voice calls statistics
- WLAN connectivity statistics
- Network diagnostics tools (Ping and Traceroute)

Figure 9. Internal Web Administration Page - Troubleshoot View


Log
Statistics
Tools
Info
Syslog
Errorlog
Here you can troubleshoot the handset and the network environment.
The error log will give you the last stored crash log. The log is not intended to be interpreted by any other than the manufacturer.
The statistics provided are presented in a very simple format and require knowledge about the software in the handset.
The voice statistics require that there is an active call.

8.2 Change Administration Password

NOTE: The administration password can only be changed using the WinPDM.

1 Open the WinPDM.

2 Select Device > General.

3 In the Administration user name field, enter user name.

4 In the Administration password field, enter password.

9. Administration

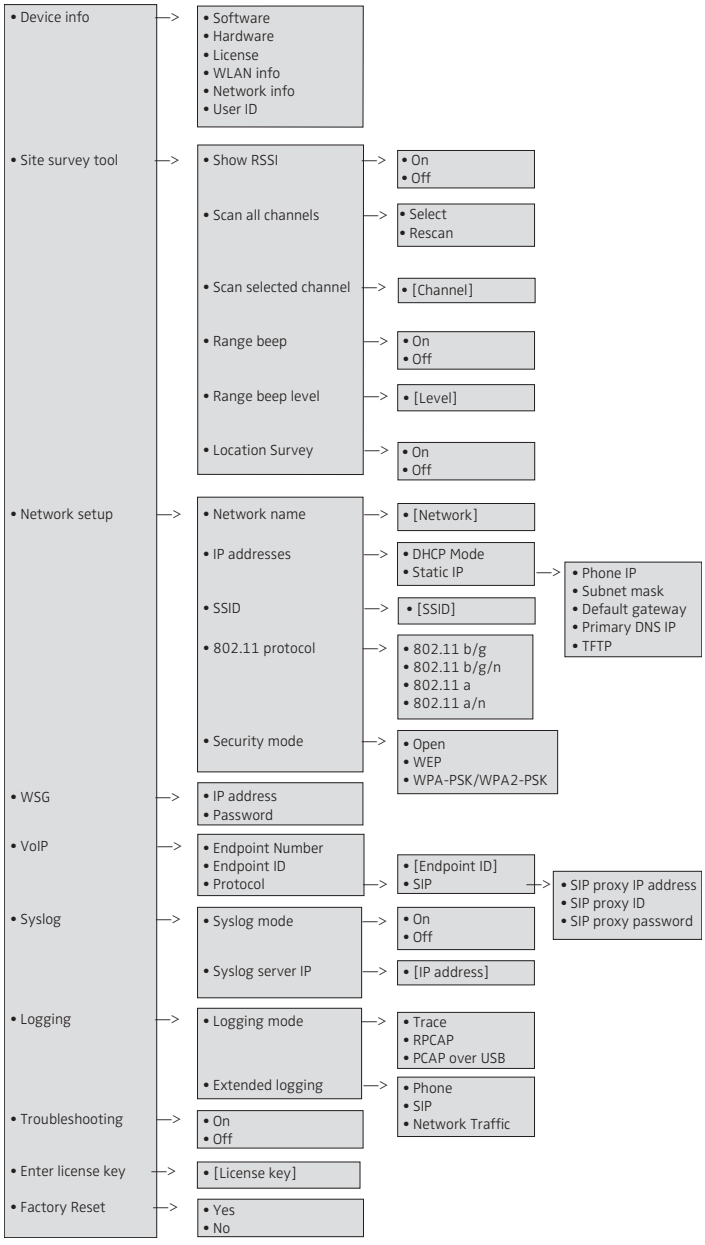
9.1 Admin Menu Tree

The handset has a hidden menu for system administrators. The Admin menu contains:

- Software and hardware information
- WLAN, network, system, and license information
- Site survey tool
- Network setup menus
- Factory reset option

To activate the Admin Menu, select Menu > Settings and press 40022.

Figure 10. Admin Menu in the Handset.



Other menus are described in User Manual, WL3 WLAN Handset and WL3 Plus WLAN Handset, TD 92929EN.

9.2 Quick Access to the Handset's Device Information

For quick access to device information, short codes can be used from the idle mode menu. To display this information, enter the following codes in the handset.

Information	Code
Software version	*#34# > Software
WLAN version	*#34# > Software
Hardware version	*#34# > Hardware
IP address	*#34# > Network info
Subnet mask	*#34# > Network info
Default gateway	*#34# > Network info
MAC address	*#34# > Hardware
Current license	*#34# > License
Current BSSID	*#76#
Current ESSID	*#76# or *#34#
Current RSSI	*#76#
Current channel	*#76#
Site survey functions	*#77#

NOTE: Other settings and information can be found on the internal web administration page, refer to section 8. Handset Internal Web Administration Page on page 69.

9.3 LED indications

The following table shows the LED indications that are used for the handset.

LED indication	Description
None	Switched off.
Green, fixed	Handset fully charged and in charger.
Green, flashing, slow	Switched on, but not in charger.
Orange, fixed	Charging
Orange, flashing	Low battery
Red, fixed	Software error. Service needed.
Red, flashing	Very low battery
Red, flashing, slow:	No network connection.

10. Troubleshooting

This section contains information on how to solve common operational problems, and information on warnings you may receive.

Go through the following lists if you encounter any problems. If this checklist does not solve the problem, contact the system administrator.

If other users have similar problems, there may be a system error.

10.1 Fault Symptoms

If any of the following Fault Symptoms occur, follow the instructions below.

Fault	Probable cause	Action or comment
The display stays dark	Low battery level or faulty handset.	Charge the battery. If the handset does not work after charging, contact the system administrator.
There is no ring signal	The handset is muted, or ringer volume is set to silent, or faulty handset.	Press and hold the Mute key, or increase volume (in the handset, select Settings > Sound & Alerts > Volume) or contact the system administrator.
Not possible to mute the handset by long press on the Sound off key/ mute button	A handset restriction preventing the user to silence the handset.	Change the parameter Prevent silent (in Audio > General).
Not possible to set the ring volume to “Silent”.		
Connected call but no sound or one way sound	IP addressing fault, or muted or bad speaker/ microphone	1) Note the IP address of the handset. Turn the handset off and ping the IP address. If something is found, the problem is an IP address conflict. 2) Check if the handsets are muted. 3) Use a headset to eliminate bad speakers/microphone.
No entries in Call list	A handset restriction preventing calls from being saved in the call list.	Change the parameter Enable call list (in Device > Call > Enable call list > Yes

Fault	Probable cause	Action or comment
Voice quality is bad	Increased traffic load or interference.	1) Check if QoS is working in both directions. Voice traffic should be prioritized on both the LAN and the WLAN. 2) Connect to other phones (wired, analogue or external) to define if it is the other end that may cause bad quality. 3) Do a site survey and check for areas with under/over coverage and other interfering 802.11 systems. 4) Do a network performance test to ensure the wired LAN/ backbone has adequate capacity. 5) Use a spectrum analyzer and look for non 802.11 interference.
Battery life is bad	DTIM might not be set correctly. U-APSD is not used. Cisco/Ekahau location client settings need to be changed.	1) Check “Beacon interval” and “DTIM” settings in the AP. 2) Verify the coverage, since low signal strength will make the handset to constantly search for other APs and thereby consuming more power. 3) Use a sniffer and check the amount of broadcast traffic that is transmitted on the WLAN. 4) Check if correct models of the chargers are used. 5) Verify with another battery. 6) If the system is supposed to use U-APSD for voice calls check the voice power save mode parameter in the WinPDM. 7) If using Cisco/Ekahau location client, change the settings.

10.2 Display Information

The following error messages can be shown in the handset display:

Display shows	Probable cause	Action or comment
No access	The handset is in range, but has no access rights. Handset has found and associated to the WLAN (a wireless network with the configured SSID and correct security settings). But it cannot connect to the gatekeeper or the WSG.	Switch off the handset and then switch it on again. If this does not work, contact the system administrator. 1) Check if the handset has an IP address by entering the “Network info” screen. If not check the WEP key if used or WPA/WPA2 passphrase. 2) If using WEP, double-check the key if the handset has no IP address. If you have a wireless sniffer, configure it to the correct key and try to decode packets both from and to the handset. 3) Check the Gateway address. Try to ping the gateway from another PC. 4) Check the WSGaddress. Try to ping the WSG from another PC.
No network The handset beeps once a minute (for max 30 minutes) in a low tone, followed by a high tone (if enabled, the vibrator also follows the beeps).	The handset has lost connection and is in one of the following states: - No network (No connection to WLAN). - No access (Connection to WLAN but not to PBX nor IMS(WSG). - Voice only (Connection to WLAN, and PBX but not to the IMS (WSG). - Messaging only (Connection to WLAN, and IMS (WSG) but not PBX).	Acknowledge the dialog window or press the mute button (the later keeps the dialog window visible). It is possible to configure the beep to Sound off or Sound once for each new state in the WinPDM (Device > General > No system warning). NOTE: When leaving a bad state for another bad state, the dialog window reopens, and the beep sounds again (if enabled).

Display shows	Probable cause	Action or comment
No network. (The handset beeps once a minute with a low tone followed by a high tone (during max 30 minutes). If the vibrator is enabled, it vibrates after the last beep.)	The handset is out of coverage, or faulty handset. The handset cannot find the wireless infrastructure with settings matching those configured in the handset.	The beeps can be stopped with the mute button. Then go into range. NOTE: When re-entering the coverage area it can take a couple of minutes before the handset automatically has registered into the system. If this does not work, contact the system administrator. 1) Check the SSID. The SSID configured in the handset must be identical to the SSID configured in the system infrastructure. 2) Check the security settings. The security settings, that is, authentication and encryption must match the settings in the system infrastructure. 3) Check for 802.11d multi regulatory domain settings. The handset (software version 2.x.x) must be able to detect in which country it is located to use the correct channel and transmit power settings. Later versions have a parameter specifying if 802.11d should be used or not. This is provided by the infrastructure according to the 802.11d standard. 4) Check which channels are used. The handset uses by default channel 1, 6 and 11. If the infrastructure is configured to use any other channel, change it to use only 1, 6 and 11 as this is the recommended setting. 5) Check that the correct Network (A, B, C or D) setting is selected.
No channel available	The handset did not receive the expected answer from the PBX during call setup, or the user attempts to make a call when the handset is displaying “Messaging only”.	Make another call (when the handset is not showing “Messaging only”). If the handset does not work after another try, contact the system administrator.

Display shows	Probable cause	Action or comment
Voice only	The handset is configured to use both a gatekeeper and a WSG, but has lost contact with the WSG.	1) Check the WSG address. Try to ping the WSG from another PC. 2) Remove the handset from the DP1 Desktop Programmer. When connected to the WinPDM through USB on the DP1 Desktop Programmer, the handset cannot connect to the WSG and may then show “Voice only”. 3) If messaging is not used in the system, verify that the WSG address is configured to 0.0.0.0.
Limited mode	The PBX is in “Server mode backup”.	
Messaging only	The handset is configured to use both a gatekeeper and an WSG but has lost contact with the gatekeeper.	1) Check the Gateway address. Try to ping the gateway from another wireless client. 2) Try to send a message. The idle connection check interval to the is much longer than to the gateway. Sometimes when all network connection is lost the handset will show “Messaging only” for quite some time, because it discovers it has lost connection to the gateway much faster than it discovers loss of connection to the WSG. In this case the handset will eventually change to “No access”. 3) If the handset is supposed to use Gatekeeper discovery, verify that the configured Gatekeeper IP address is 0.0.0.0. 4) Check the Endpoint number and the Endpoint ID. If both are configured, they MUST match the Endpoint ID and Endpoint number registered in the IP PBX. Clear the Endpoint ID.
SERVICE NEEDED Parameters corrupt NOTE: This display message is only shown in English.	Faulty handset.	Select the reset option on the middle soft key. If this is not available or the problem persists send the handset for service.
Enter PIN code	Phone lock is activated.	Enter the required PIN code. If the PIN code has been lost, enter a new PIN code using the WinPDMWSG or do a factory reset using the WinPDMWSG.
Battery low, charge now	The battery level is low.	Charge the handset, or replace or charge the battery.

Display shows	Probable cause	Action or comment
Phonebook is not available at the moment.	The phonebook is not activated or does not respond.	Try again later or if the fault persists do a factory reset using the admin menu or using the WinPDMWSG. Note that it may take several minutes for the phonebook to be available if there are many entries in Contacts and/or company phonebook.
Voice mail number not defined	There is no Voice mail number defined in the handset.	Define a Voice mail number using the WinPDMWSG.
Remotely updated	The handset restarts after a parameter upgrade.	

10.3 Troubleshooting from the handset Internal Web Administration Page

It is possible to view statistics for Voice and WLAN connectivity and to create debug and error logs from the internal web administration page. The logs and the statistics can then be interpreted by your supplier.

1 In a web browser, enter the handset´s IP address to access the internal web administration page for the handset. The IP address can be found in the handset´s menu (Settings >Device info >Network info).

2 Click “Troubleshoot“.

Refer also to 8.1.2 Troubleshoot View on page 70.

11. Related Documents

Data Sheet, WL3 WLAN Handset and WL3 Plus WLAN Handset	TD 92927EN
User Manual, WL3 WLAN Handset and WL3 Plus WLAN Handset	TD 92929EN
Data Sheet, DP1 Desktop Programmer for WLAN Handset	TD 92932EN
Data Sheet, Portable Device Manager (PDM), Windows version	TD 92635EN
Installation and Operation Manual, Portable Device Manager, Windows version	TD 92712EN
Data Sheet, OpenStage Wireless Service Gateway (WSG)	TD 92972EN
Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG)	TD 92442EN
System Description, Ascom VoWiFi System for Siemens	TD 92946EN
System Planning, Ascom VoWiFi System for Siemens	TD 92945EN
Function Description, Ascom VoWiFi System for Siemens	TD 92947EN

12. Document History

For details in the latest version, see change bars in the document.

Version	Date	Description
A	7 November 2012	First version

Version	Date	Description
B	13 December 2013	• Changed heading and added note and subchapter about “Disable message in charger” 6.5.7 Actions when the Handset is Placed in the Charger and inserted Show and indicate messages in charger in 6.8 Messaging Settings. • Added disable permanent mute function in 6.5.9 Prevent Mute function and 10.1 Fault Symptoms • Added “Message alert during call” in 6.8 Messaging Settings • Added “No system” with popup and beep info in 10.2 Display Information • Added that Certificate is optional during authentication for PEAP/MSCHAPv2 and EAP/TLS in 6.4.5 802.1X with PEAP-MSCHAPv2 and 6.4.6 EAP-TLS • Added Configurable automatic key lock in and 6.5.3 Automatic lock time and 6.5.4 Automatic key unlock • Added 6.5.10 Prevent Calls from being saved in the Call list and added this also in 10. Troubleshooting • Added that it’s possible to turn off verification of server certificate for SIP TLS in section SIP protocol in 6.10.2 VoIP Protocol • Added WLAN version in 9.2 Quick Access to the Handset’s Device Information • Added section 7.4 Location Survey • Added 6.8.1 Configure Message Alerts with Beep Codes • Changed “WL3 Settings” to “WSG Settings” in 4.4 Installation using the Handset’s Admin Menu • Added left soft-key in 6.5.16 Soft Key Functions During Call • Added text about “Remotely updated” when handset parameter is upgraded in new Upgrade Handset Parameter section in 5.1.2 Upgrade Handset Software and 10.2 Display Information. Also added “Remotely updated” dialog window text in 5.1.4 Upgrade Software using WinPDM. • Edited “Automatic key lock” in 6.5.1 Automatic key lock and in 6.14 Push-To-Talk (PTT) Group Call. • Replaced “popup” with “dialog window”

Version	Date	Description
		• Added OSCAR to PTT in chapter 6.14 Push-To-Talk (PTT) Group Call • Edited Replace and Move Licenses using PDM section in 5.2.4 Replacement of Handset with WinPDM Only • Renamed (and edited) “6.5.9 Configure Profiles” to “6.6 Profiles” • Added Custom sounds according to beep code, and Appendix B: Programming Custom Sound. • Edited 6.5.15 Shortcuts. Soft keys are moved from PDM Shortcuts menu to User Profile menu • Added 6.9.3 Call Predefined Number without Sending Alarm • Edited 6.9.2 Push Button Alarm • Edited 6.9.5 Man-down and No-movement Alarm • Changed “Determines” to “Defines” in the whole document • Changed “Shall be” to present tense in the whole document • Edited 6.12.6 Screen Saver • Edited 6.10.8 Message Centre Number • Added “In charger message absent” in 6.5.7 Actions when the Handset is Placed in the Charger • Edited in section “Additional shortcut settings” in 6.5.15 Shortcuts • Added Emergency Ring Signal section in 6.9.5 Man-down and No-movement Alarm • Moved “6.9.5 Emergency Call Alarm” to “6.10.6 6.10.6 Emergency Call Numbers” and changed title to 6.9.5 Man-down and No-movement Alarm • Edited text to have up to 5 emergency call numbers in 6.9.5 Man-down and No-movement Alarm • Edited 6.5.1 Automatic key lock and 6.5.2 Phone lock sections • Added configurable time zone “Other” in 6.11.1 Set Time & Date • Edited heading from “Calling Line Restriction” to “Calling Line Identification Restriction“ and added a NOTE: • Edited heading from “Busy on 1 / Disable call waiting” to “Call waiting behavior” and text in 6.10.13 Call waiting behavior. • Added VoIP > Endpoint number and made layout edits in 9.1 Admin Menu Tree

Version	Date	Description
		• Added DNS SRV in 6.10.2 VoIP Protocol (SIP Protocol section) • Added Easy Deployment: - Edited 4. Installation of WLAN Handsets - Added subchapter 4.1 Handset Installation in the WLAN System using Easy Deployment - Added Appendix C: Easy Deployment - In Appendix C: Easy Deployment added image Siemens_006.eps and images: 2930_008.png, _009, _011, _012 • Added “No channel available” in 10.2 Display Information • Added that Beeps and Enhanced beeps are customizable: - Added TIP: in 6.8.1 Configure Message Alerts with Beep Codes - Added subsection B.1 Customize the default handset beeps in and Appendix B: Programming Custom Sound • Vocabulary changes: - Replaced “PDM” with “WinPDM” - Updated images with above (2930_001.eps), - Updated image 2773_001.eps - Changed heading 4.2 from “Installation without Central Device Management (WSG)” to 4.3 Installation with WinPDM - Removed “Centralized Management” from 1.1 Abbreviations and Glossary, and edited Device Manager • The complete document is updated with regard to US English • Minor text and layout changes

Appendix A: Working with Templates

This section describes how to manage templates when using both the WinPDM and the Device Manager in the WSG.

When creating a template in the WinPDM and in the Device Manager, the templates must be identical to avoid that the template's parameters override each other when synchronizing the handset with WinPDM or Device Manager.

A template can be copied between WinPDM and Device Manager.

The following workflow describes how to create a template in the Device Manager and then copy it to the WinPDM. However, it is also possible to create a template in WinPDM and copy it to the Device Manager.

A.1 Create a Template

1 Open the Device Manager in the WSG.

2 Select the "Templates" tab and open the menu "Template > New...". The New Template window is opened.

3 Select the corresponding device type and parameter version that matches the software version installed on the handset. Give the template a descriptive name.

The parameters that are not part of the template will be left unchanged on the handset. The parameter version of an installed handset is visible under the Numbers tab or the Devices tab.

4 Click "OK".

5 Select the checkbox of each parameter that you want to be part of this template and enter the proper value.

6 Click "OK" to save the template.

A.2 Export a Template

1 Open the Device Manager in the WSG.

2 Select the "Templates" tab.

3 Select the template to be exported.

4 Select "Template" > "Export". Alternatively, right-click the template and select "Export...". The Export templates window is opened.

5 Give the template (*.tpl) a descriptive name and click "Save".

See also A.3 Import a Parameter File.

A.3 Import a Parameter File

The parameter version file (*.def) the template is based on, must have been imported to the WinPDM to be able to import the template later on. If the parameter file is not imported, do as follows:

1 Open the WinPDM.

2 Select "File" > "File management".

3 Select the "Parameter definition" tab.

4 Click "Add". The Import files window is opened.

5 Locate the parameter file (*.def), or the package file (*.pkg) where the parameter file is included. Ask you supplier.

6 Click “Open“ to import the file.

A.4 Import a Template

1 Open the WinPDM.

2 Select “File“ > “Import“ > “Templates...“. The Import templates window is opened.

3 Locate the template to be imported.

4 Click “Open“ to import the template.

Appendix B: Programming Custom Sound

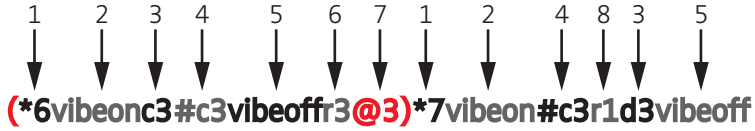
Before starting programming custom sound, it is recommended to have basic knowledge about notes.

The melody in a custom sound is represented by a text string consisting of several elements.:

Element		Sub element	Values
Note	>	Octave-prefix	*0 (A=55Hz) *1 (A=110Hz) *2 *3 *4 (default) *5 *6 *7 *8 (A=14080 Hz) If no octave prefix is added, the prefix *4 will be used.
		Basic notes	c d e f g a b
		Ess notes (flat notes)	&d &e &g &a &b
		Iss notes (sharp notes)	#c #d #f #g #a
		Duration	0 (Full-note) 1 (1/2-note) 2 (1/4-note) 3 (1/8-note) 4 (1/16-note) 5 (1/32-note)
Silence	>	Rest	r
		Duration	1 to 5 (1 = long pause, 5= short pause)
		Duration specifier	. (Dotted note) : (Double dotted note) ; (2/3 length)

Element	Sub element	Values
Vibration	N/A	Vibeon Vibeoff
Repeat	N/A	@0 (repeat forever) @<number of repetitions>, for example: "@2" repeats the melody string 2 times.

Figure 11. Example of a melody/text string.



.

1	Octave-prefix
2	Vibration is turned on. The handset vibrates continuously.
3	Basic note with 1/8 duration
4	Iss note with 1/8 duration
5	Vibration is turned off
6	Short pause
7	The melody within brackets is repeated 3 times before the handset plays the rest of the melody.
8	Long pause

B.1 Customize the default handset beeps

If it is desired to create a custom sound out of any of the default handset beeps (Beep 1 - 7 and Enhanced beeps 1 - 7), the default definition of each beep can be used as a starting point for the further programming of the sound. The default definitions are as follows:

Beeps:	**Definition (default):**
Beep 1:	*5b4r4
Beep 2:	(*5b4r4@2)
Beep 3:	(*5b4r4@3)
Beep 4:	(*5b4r4@4)
Beep 5:	(*5b4r4@5)
Beep 6:	(*5b4r4@10)
Beep 7:	(*6e4*6a4*6e4*6a4r4@10)

Enhanced beeps:	**Definition (default):**
Enhanced beep 1:	*6e2r2r1

Enhanced beep 2:	*6e3r3e3r3r1
Enhanced beep 3:	*6e4r4e4r4e4r4r1
Enhanced beep 4:	*6c2r5:d2r5:e2r5r1
Enhanced beep 5:	*6e4r4e4r4e4r3.e4r4e4r2e4r4e4r4e4r3.e4r4e4r4r1
Enhanced beep 6:	Beat 500, (*5#f3g3#g3a3#a3b3*6c3#c3d3#d3e3r3@9)
Enhanced beep 7:	*6(c4e4@52)

Appendix C: Easy Deployment

With the Easy Deployment process, a handset is installed without the need for the WinPDM, by using a (staging) WLAN, with a predefined SSID and security profile.

NOTE: Easy Deployment can only be used in a 2.4 GHz staging WLAN. This is the default frequency band of the handset, when switched on. Thereafter the production WLAN is used with any configured channel and band.

C.1 Prerequisites

- The WLAN network needs at least one AP on the 802.11b/g radio, that allows access to the WSG, and uses the following default configuration, which cannot be changed:

SSID:	AWS-INIT
Security key:	WPA-PSK / WPA2-PSK
WPA-PSK passphrase:	AWS-INIT

- In the handset, all other network parameters must be at their default settings, which means for instance:

DHCP mode:	On
802.11 protocol:	802.11b/g/n
802.11b/g/n channels:	1,6,11
World mode regulatory domain:	World mode (802.11d)

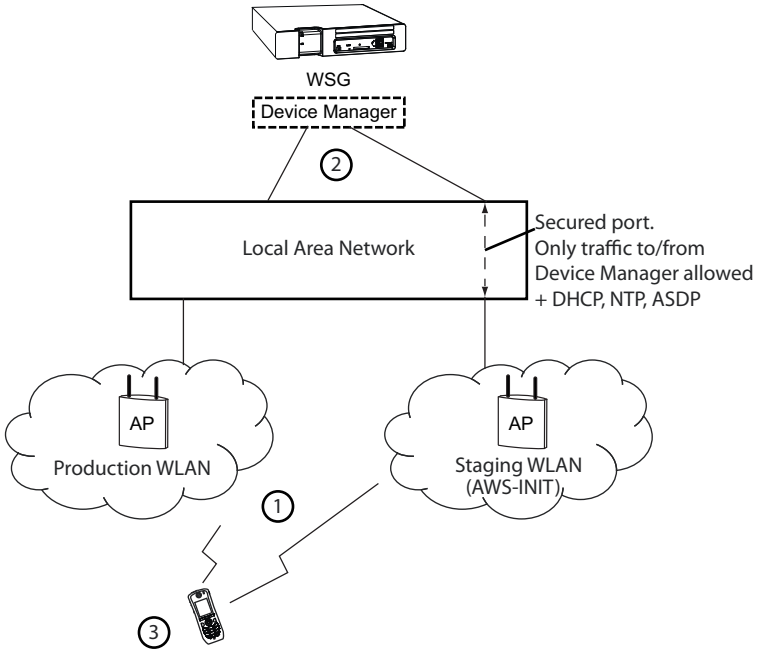
- If it is used in the WSG server, the password to log in is needed.
- The WSG server port must be open and not blocked.
- No SSID for any of the networks A-D is configured in the handset.
- The DHCP offer for the AWS-INIT network must include an IP address of an NTP server, to provide the handset with the correct system time (needed for certificate validations).

NOTE: The intended number to be used by a handset, is entered from the handset's keypad, after a successful first access to the Messaging server(WSG).

The Easy Deployment process, consists of three phases:

- WLAN discovery
- WSG server discovery
- Parameter download

Figure 12. Easy Deployment



C.2 WLAN discovery

1 The WLAN discovery starts, when the new handset starts up. An already configured handset uses an entry stored in Network A, B, C, or D, and tries to associate with a WLAN, that uses the SSID, that once was configured in the Network A-D.

If there is no WLAN network (SSID) configured in the handset, the handset tries to associate with a predefined default WLAN with the SSID of AWS-INIT, on the 2.4 GHz frequency band on an AP running on channel 1, 6, or 11, see (1) in figure 12.

If the AWS-INIT is not connected to within ten seconds, the handset tries to connect to an open network. If this also fails, these two alternatives are tried for ten seconds each, until succeeded.

NOTE: It is not recommended to use an open network for staging, due to security reasons. The staging network (AWS-INIT) should be set up to only allow traffic to/from the WSG, and services for Easy Deployment (like DHCP, NTP, ASDP). This is to block other, than dedicated clients, to use the network.

During this connection, a dialog window “No network” is displayed in the handset.

NOTE: The WLAN discovery process stops, if any SSID of Network A-D is manually filled in, either by using the handset´s Admin menu, or the WinPDM.

TIP: The SSID can be seen in the handset´s Admin menu; Press “Menu“, select “Settings“ and enter 40022. In the Admin menu, select Device info > WLAN info. The SSID (channel): field shows the SSID (network name).

TIP: If the green wireless network connection bars (up in the left of the handset display) comes and goes alternately, the pre-shared key (PSK) on the AP is probably wrongly configured, and the handset cannot connect to the AP. After a time-out, “No network” is shown in the handset display.

C.3 WSG server discovery

2 Once the handset has a WLAN connection, the second step is to automatically get the IP address to the WSG, that runs the Device Manager, see (2) in figure 12.

The two methods, on how to automatically get the IP address, are as follows:

- Using the vendor option functionality, Option 43 of a DHCP server
- Using the Ascom Service Discovery Protocol (ASDP) implemented in the handset

In both cases, the IP address received, is not saved, so this process is repeated on next startup, unless a WSG IP address is set.

C.3.1 Server discovery using the DHCP Option 43

A DHCP server can be configured to return an WSG IP address, as a part of the DHCP response to the handset, together with other needed DHCP parameters. The WSG IP address is sent using Option 43 (Vendor Specific Data).

A DHCP request from a handset uses the Option 60 Vendor Class Identifier (VCI) to identify itself to the DHCP server. (The VCI string: OpenStageWL3, is the Object Identifier (OID) for the handset). By this, a DHCP server can be configured to return an WSG IP address only to those clients that expect it. Option 60 also allows different clients to use different settings in the Option 43, if there are multiple clients in the network.

After the handset receives the (dynamic) IP address to the Messaging server(WSG), it tries to login to the Device Manager. The DHCP Option 43 is ignored, once the WSG IP address is configured (static) in the WSG (in the Device Manager application).

Setting up Option 43 on a DHCP server, is not that very well documented, and not very known by network administrators. There are many types of clients that can use this feature, for example, Cisco is using it for its LWAP APs to find a WLAN controller to attach to.

Examples on how to configure and troubleshoot Option 43 on a Linux and Microsoft Windows 2003/2008 server, is found at the end of this appendix.

C.3.2 Server discovery using the Ascom Service Discovery Protocol (ASDP)

If the DHCP response does not contain a valid WSG IP address, the handset tries to find a WSG server using the Ascom Service Discovery Protocol (ASDP) instead. An ASDP discovery message is sent using UDP to the broadcast IP address, containing the MAC address of the handset.

A WSG server, configured to respond to ASDP discovery messages, responds with an ASDP offer as a unicast UDP message sent to the handset.

The protocol allows each WSG support different client services, and can separate different types of handsets to be serviced by different modules. If there are multiple WSG modules set up to support ASDP for WLAN, more than one response is received by the handset. A single response is randomly selected (normally the modules that responds fastest.)

If no response is received, a new ASDP request is retransmitted periodically, and the IP address remains unconfigured.

See the second section of C.5.1 The Ascom Service Discovery Protocol (ASDP) Explained on page 93, on how to configure an WSG to support the handset as an ASDP discovery client.

C.4 Parameter download

3 After successfully receiving the WSG IP address, the handset tries to login to the Messaging system.

The handset has, at this stage, no number stored internally, and does not know its identity in the Messaging system. When the dialog window "Login:" is displayed in the handset, enter the intended endpoint number (that is, the phone number of the handset), that the handset uses to login to the Messaging system.

Once a valid endpoint number is stored in the handset, the handset tries to login.

After a successful login, the handset is synchronized with the parameters stored in the “Number record” in the Device Manager application (in the WSG), see (1) in figure 12.

NOTE: It is vital, that especially the WLAN network settings, are configured correctly, as the handset receives a new set of parameters that contains the WLAN parameters for the production WLAN. It is also important that, if using any WLAN security protocol that uses certificates, the certificates (server/client) must be saved to each handset Number in the WSG (Device Manager application). If the WLAN parameters are wrong, the handset cannot associate with, neither the staging, nor the production WLAN, again.

TIP: If, by mistake, a wrong number is entered, when the dialog window "Login:" is displayed, make a factory reset, see 5.1.8 Perform a Factory reset on page 22, and start over again.

NOTE: If there are no “Number records” already configured in the Device Manager before the handset logs in for the first time, perform as follows:

1) In the Device Manager, be sure to check and save the automatically created “Numbers record” by right-clicking on the “Number’s” entry. 2) Check in the created record, under Device >Unite > IP address, that the IP address for the Messaging system is correct. Then the handset can login to the same Device Manager again.

TIP: The Device Manager’s IP address can also be checked by using the handset: In the handset´s Admin menu, select “Device Info” > “Network info”. Then scroll down to “Device manager:” to see the IP address.

C.5 Using Easy Deployment together with Client Certificate Distribution

C.5.1 The Ascom Service Discovery Protocol (ASDP) Explained

A handset can find the Messaging server (WSG), using the Ascom Service Discovery Protocol (ASDP). The protocol is binary and uses Unite messaging.

For this purpose, a discovery message (BC) using the messaging protocol is sent, using UDP to the network's broadcast IP address. The discovery message contains the following data of the wanted service:

Client Description	
Client class:	PP
Client family	WLAN
Client name:	< MAC Address of the handset >
etc.	

Service wanted	
Service family:	""
Service name:	WGW
etc.	

A Messaging server (WSG) that receives this message, responds with an offer (UC) as an unicast UDP message sent to the handset.

If more than one response is received by the handset, a single response is randomly selected. If no response is received, a new request is retransmitted periodically, while the IP address to WSG remains unconfigured.

Configuring WSG to support WLAN service discovery clients

For each module, the Ascom Service Discovery Protocol must be configured to support WLAN clients as follows:

1 Login in to the module and select Configuration > Other >Advanced configuration.

2 Select WLAN System and enable Service Discovery.

C.5.2 DHCP Vendor Options Explained

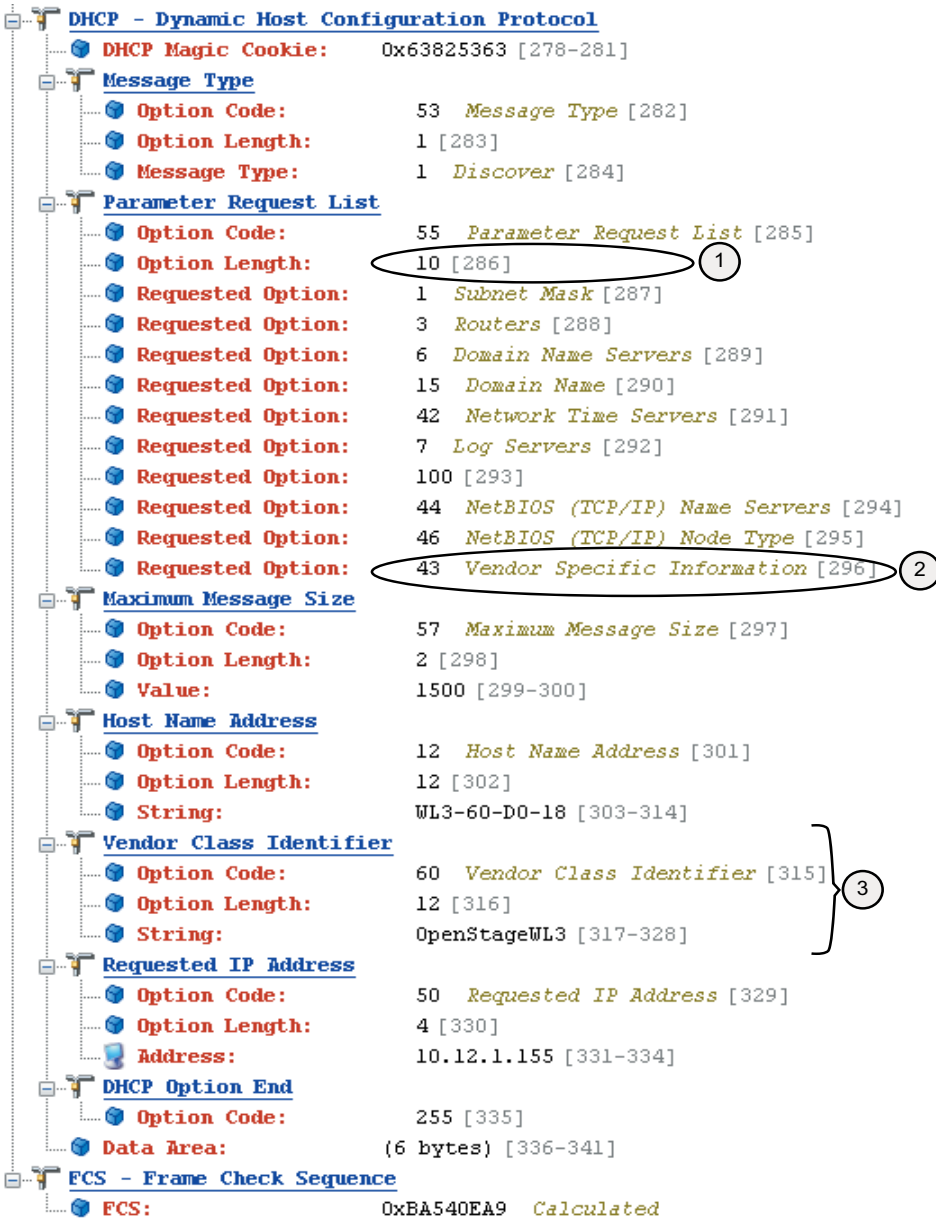
The Dynamic Host Configuration Protocol (DHCP) is described in the Request for Comment (RFC) No. 2131 and 2132. (The RFC is a publication of the Internet Engineering Task Force (IETF) and the Internet Society, which are the principal technical development and standards-setting bodies for the Internet.)

Although the RFC 2132 describes the BOOTP options and vendor options, the document lacks examples on how the vendor option 43 is used, configured, and troubleshooted, for a network administrator. An attempt to explain this, is made in the following sections of this Appendix C.

The DHCP options described in the RFC 2132, can also, besides a DHCP server, also be used by a client. An example, on how a handset sends a DHCP Discover message

to a DHCP server during the boot process, is shown in figure 13:

Figure 13. Example of a DHCP Discover message (Omnipeek trace).


DHCP - Dynamic Host Configuration Protocol
DHCP Magic Cookie: 0x63825363 [278-281]
Message Type
Option Code: 53 Message Type [282]
Option Length: 1 [283]
Message Type: 1 Discover [284]
Parameter Request List
Option Code: 55 Parameter Request List [285]
Option Length: 10 [286]
Requested Option: 1 Subnet Mask [287]
Requested Option: 3 Routers [288]
Requested Option: 6 Domain Name Servers [289]
Requested Option: 15 Domain Name [290]
Requested Option: 42 Network Time Servers [291]
Requested Option: 7 Log Servers [292]
Requested Option: 100 [293]
Requested Option: 44 NetBIOS (TCP/IP) Name Servers [294]
Requested Option: 46 NetBIOS (TCP/IP) Node Type [295]
Requested Option: 43 Vendor Specific Information [296]
Maximum Message Size
Option Code: 57 Maximum Message Size [297]
Option Length: 2 [298]
Value: 1500 [299-300]
Host Name Address
Option Code: 12 Host Name Address [301]
Option Length: 12 [302]
String: WL3-60-D0-18 [303-314]
Vendor Class Identifier
Option Code: 60 Vendor Class Identifier [315]
Option Length: 12 [316]
String: OpenStageWL3 [317-328]
Requested IP Address
Option Code: 50 Requested IP Address [329]
Option Length: 4 [330]
Address: 10.12.1.155 [331-334]
DHCP Option End
Option Code: 255 [335]
Data Area: (6 bytes) [336-341]
FCS - Frame Check Sequence
FCS: 0xBA540EA9 Calculated
1
2
3

In figure 12, the numbered points illustrate the following:

1 The amount of options requested

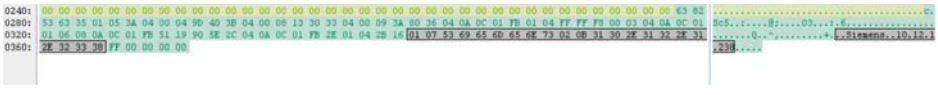
2 The handset asks for Vendor options

3 The handset requests a specific set of Vendor options, by sending a Vendor Class Identifier (VCI)

Figure 14. Example of a DHCP Acknowledge (Omnipeek trace).

DHCP - Dynamic Host Configuration Protocol
DHCP Magic Cookie: 0x63825363 [278-281]
Message Type
Option Code: 53 Message Type [282]
Option Length: 1 [283]
Message Type: 5 ACK [284]
Renewal (T1) Time Value
Option Code: 58 Renewal (T1) Time Value [285]
Option Length: 4 [286]
Value: 302400 [287-290]
Rebinding (T2) Time Value
Option Code: 59 Rebinding (T2) Time Value [291]
Option Length: 4 [292]
Value: 529200 [293-296]
IP Address Lease Time
Option Code: 51 IP Address Lease Time [297]
Option Length: 4 [298]
Value: 604800 [299-302]
Server Identifier
Option Code: 54 Server Identifier [303]
Option Length: 4 [304]
Address: 10.12.1.251 [305-308]
Subnet Mask
Option Code: 1 Subnet Mask [309]
Option Length: 4 [310]
Address: 255.255.248.0 [311-314]
Routers
Option Code: 3 Routers [315]
Option Length: 4 [316]
Address: 10.12.1.1 [317-320]
Domain Name Servers
Option Code: 6 Domain Name Servers [321]
Option Length: 8 [322]
Address: 10.12.1.251 [323-326]
Address: 81.25.144.94 [327-330]
NetBIOS (TCP/IP) Name Servers
Option Code: 44 NetBIOS (TCP/IP) Name Servers [331]
Option Length: 4 [332]
Address: 10.12.1.251 [333-336]
NetBIOS (TCP/IP) Node Type
Option Code: 46 NetBIOS (TCP/IP) Node Type [337]
Option Length: 1 [338]
Value: 4 [339]
Vendor Specific Information
Option Code: 43 Vendor Specific Information [340]
Option Length: 20 [341]
Option Data: 0x01054173636F6D020B31302E31322E312E323338 [342-361]
DHCP Option End
Option Code: 255 [362]
FCS - Frame Check Sequence
FCS: 0x5151FDD1 Calculated

Figure 15. Example of a DCHP ACK in Hex (Omnipeek trace)



4 In figure 14, the handset then sends a DHCP ACK, that confirms the settings the handset agreed upon to use, like the “43 Vendor Specific Information”.

When comparing the, by the handset “Requested Options” in the trace in figure 13, it shows that not all requests were agreed upon by the DHCP server. For example, the DHCP server does not acknowledge the options “42 Network Time Servers”, “7 Log servers”, and an, by Omnipeek unknown, option “100”. Some options are also added by the DHCP server (without being asked for by the handset), for example, option 58, 59, 51, and 54, which are compulsory.

The vendor 43 option field explained according to the RFC

A DHCP server is configured with options prepared to supply clients with networking information that is requested, by the clients. Either the options are entered in the IP address scope, or for all scopes.

Less known, is that a selected set of options based on the client type, can be sent to clients. This allows a DHCP server to override the standard scope settings with other settings, which are unique for a specific client type, or transmit dedicated values, that are not part of the DHCP standard.

These are called “vendor options”, and they are sent to the client using option 43.

Adding vendor specific information to option 43, requires the use of tags (named fields), in the option 43 record. Such options are called “sub-options”, and they are included in the DHCP offer as type-length-value (TLV) blocks, embedded within Option 43. The definition of the sub-option codes and their related message format is left to the vendors.

The Option 43 is used in WLAN by several vendors. Handset vendors use Option 43 to send specific values to their family of handsets, and WLAN vendors use Option 43 to identify APs, and to find controllers (by distributing IP addresses using option 43). A dedicated tag for a specific client is only identified by a client which asks for it, and has a dedicated use for the tag. An example is the IP address to a WLAN controller, which probably only APs can use.

To avoid having to send all option 43 codes with useless tags to all clients, the use of option 60, makes a client identity itself as a specific client type. This type is then mapped to an entry in the DHCP server, which contains the vendor 43 options for that type.

Option 60 is normally coded as an ASCII string, but can also be binary. The Option 60 is called Vendor Class Identifier (VCI), and is defined by the manufacturer and programmed into the DHCP client of their devices.

The following table lists some examples of Option 60 string values:

Vendor	Device	String	Option 43 returned value
Aruba	Aruba AP	ArubaAP	Loopback address of Aruba master controller
Cisco	Cisco AP	Cisco AP c1250	IP address of WLAN controller
Siemens	WL3 WLAN Handset	OpenStageWL3	WSG IP address and hostname

Option 43 field definition

The information in Option 43 is an opaque object of n octets, and the definition of this information is vendor specific.

Option 43:

Code	Length	Vendor specific information elements		
43 (2b)	n	i1	i2	i3 etc.

The code for the option is “43”, and its minimum length is 1. The number i1 … etc refers to information bytes. The length value n refers to the amount information bytes in the field.

The value of the length octet does not include the two octets specifying the tag and length

Option 43 with “Encapsulated vendor-specific information”:

Normally a vendor needs to have multiple parameters to be used for configuration of the clients. Then the options are encoded using the "Encapsulated vendor-specific extensions". This format uses the TLV syntax (type length value), and is described in RFC 2152. When “Encapsulated vendor-specific extensions” are used, the information bytes 1-n have the following format:

Code (tag)	Length	Data items			Code	Length	Data items			Code	Length
T1	n	D1	D2	...	T2	n	D1	D2	...	...	...

The different information bytes, sub-options, are in daily language called “tags”.

The tags codes are numbered options, created by the vendor like 01, 02, 83, 243 etc.

In the table above, the code for the option is “43”, as well as the total length, are omitted.

NOTE: Depending on the system that is used to configure the DHCP options, an administrator can enter each sub-option separately, or enter all values in a single concatenated string. Since each value contains a header, a length field, and the parameter itself, this can be difficult to enter correctly. Some servers require the entry of values in the hexadecimal format, while others use ASCII strings.

For the handset, the option 43 sub fields are defined according to the following table:

Code (tag)	Length	Data items	Code	Length	Data items	Code (optional)
01	7	Siemens	**02**	7-15	IP v4 address to WSG (Device Manager) (dot-decimal)	255

The code 255 is used as an optional marker of the end of the vendor field.

When entering this information in a DHCP server, the administrator must observe that the field length of the IP address can vary, depending on the amount of digits used. If, for example, using the address of 10.30.5.7, the length is 6 numbers, plus 3 dot-separators in all 9 bytes. If using an IP address like 192.168.100.101, the length is 15 bytes. Some server interfaces can assist in calculating the length.

Example:

To deploy a handset against a WSG, with IP address 10.30.4.120, the following data is be sent as option 43:

Hexadecimal:	**01**:07:53:69:65:6D:65:6E:73:**02**:0B:31:30:2E:31:32:2E:31

Printable text:	\x01\x07Siemens\x02\x1210.30.4.120

NOTE: The first option in the OEM string (made bold in the table above), is used to verify that the data received in the client, is for the WLAN handset, this is called a “magic number”.

TIP: Search the internet for a tool that can assist in creating this string in Hexadecimal format.

Vendor Class Identifier (VCI)

Vendor/OEM	Value
Siemens	OpenstageWL3

C.5.3 Configuration Example of a Linux Server using DHCP Option 43

The following example is from an Ubuntu Linux server, and the information is entered in the “/etc/ltsp/dhcpd.conf” file:

```
# Defining the option 43 with the proprietary sub-opcodes.
option space easy;
option easy.oem code 1 = string;
option easy.ims code 2 = string;

class "vendors" {
  match option vendor-class-identifier;
  vendor-option-space easy;
}

subclass "vendors" "OpenstageWL3" {
  option easy.oem "Siemens";
  option easy.ims "10.30.4.120";
}
```

There are two options, configured as code1 and code 2, and both are defined as strings.

The server maps the string "OpenstageWL3", that was received from the handset using option 60, as defined in the subclass paragraph.

Note that there is no need to describe the length of the fields.

C.5.4 Configuration Example of an MS Windows 2003 Server using DHCP Option 43

The DHCP server in a Microsoft Windows Server system, is by default already configured with the Vendor Classes seen in the table below, plus the DHCP standard options.

The standard options are used by all clients, while the Vendor class option adds/ overrides options for specific clients.

Name	Options	Used by VCL clients with	Option 60 Vendor class mapping
Microsoft Windows 2000 options (Overrules the other two)	1, 3, 6, 15, 31, 33, 43, 44, 46, 47, 121 and 249	Windows 2000, and higher XP, Vista, Win7 and Win 8	"MSFT 5.0"
Microsoft Windows 98 options		Windows 98 and Window ME	"MSFT 98"
Microsoft options		Windows 98, Me and 2000 clients	"MSFT"

An administrator can add new Vendor classes as described below in the section Define new vendor class to support multiple types of clients on page 101. But it is not possible to delete the Microsoft built in classes and the standard class.

The DHCP server is preconfigured with a list of normally used DHCP options. Any missing DHCP option can be added as an administrator-defined option, either for each scope, or for the whole server.

C.5.5 Configuration of Option 60 and 43 using the standard DHCP vendor class

Adding the option 60 and 43 to the standard set of DHCP, at least for a lab environment this is a simple, small and fast solution, but has the following drawback: There can only be one set of options configured per scope, so having different vendor's equipment in the system, requires different scopes. For example, lightweight APs and handsets may not use the same scope.

Option 43 should then contain a complete data set with all needed sub-options stored in a TLV format. This is, in some literature, described as using the RAW format of option 43. The TLV format is best entered using a data type of binary.

NOTE: By configuring option 43 direct on the standard scope, any DHCP client is offered this value, independent of the Vendor Class ID that is used by the client. Only clients who understand the received string benefit from this value. Trying to solve this problem, by manually setting option 60 to a specific Vendor Class ID on the standard scope, has no effect. On a Microsoft DHCP server, the Vendor class IDs are entered using a dedicated procedure, which allows the usage of Multiple Vendor Classes. This is why option 60 is not listed as an option in the default standard DHCP class. There is, therefore, no need to enter Option 60 values direct on a scope by creating a new option.

TIP: There are several documents on the internet that gets this process wrong.

Configuration of Option 43

The following example illustrates how to set a vendor 43 option on the standard DHCP class, which is feasible if only vendor option 43 is needed:

NOTE: If set, this option 43 is also offered to client computers.

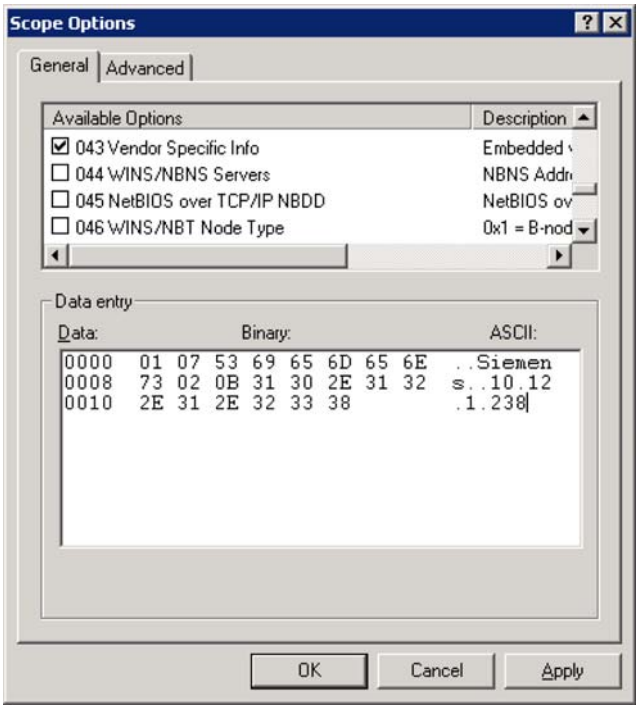
1 On the DHCP server, click the scope that the handsets should use, then right-click on Scope Options, and select Configure Options.

2 On the “General tab” (the default Standard DHCP class), scroll down, and select option 043 (which is the “Vendor Specific Info” option).

3 In the data entry field, there are two ways of entering the information. Click to the left in the box, to enter the string in binary, and to the right, to enter the string in ASCII. (It is possible to switch between them.)

Enter the values, as described in previous sections. Remember to get the length values in the TLV string correct.

Figure 16. Option 43 using a standard DHCP vendor class.



TIP: If the length value is unknown, enter the TLV value as follows, as everything inside the parenthesis is auto calculated using the “Auto-len” feature:

01 ("Siemens")02(192.168.5.1)

Then click OK and save the new option 43.

4 Check that the options are entered correctly. Note that the Vendor class is “Standard”, which means that no specific class is used, and that the User class is "None", which means that it is the default user class. The handset does not send any request with a user class filled in.

NOTE: Do not enter the value 2b 14 (43 20), which is the option class and the total length. This is added by the DHCP server, when this option is presented to the client.

5 Test the configuration. If the Option 43 is not working as expected, verify the behavior with a packet capturing tool.

C.5.6 Advanced Configuration of Option 60 and 43 using a new vendor class

The recommended way of setting up Vendor options, is to use Vendor classes, instead of the Global standard Default DHCP class. With this solution, option 60 is not configured as an option in a scope, instead a Vendor class is created.

Microsoft uses a method, that allows the administrator to set up the sub-options (that will be part of the vendor options, as a complete set of sub-options, which then are concatenated to the 43 option string by the server. Each sub-option (called "code") is defined with the sub-option numbers, as described by the vendor. In the case of the VoWiFi handset, the sub-options are 01 and 02.

NOTE: The DHCP server automatically calculates the length of each sub-option, and the total length of the whole string, and attaches the option ID of “43” at the beginning of the string.

NOTE: If option 43 is configured, using “code 43”, the “code 43” option is added to the concatenated string. Then double headers are added (one created by you, and one created by the system), and the string is not functioning as intended.

Instead, fill in the created sub-options with correct values. The sub-options are then automatically concatenated to the string, and creates an option 42 on the fly.

Define new vendor class to support multiple types of clients

To include the needed information for a handset, an administrator has to define a new vendor class as follows:

1 Right click on the DHCP server object, and select “Define Vendor Classes”. Then click “Add”.

2 In the New Class dialog box, enter a descriptive name for the Vendor class. For example enter, in the Display name: field: “SiemensWL3 handset”, and in the Description: field: “Option 43 for Easy Deployment”. These fields are only used for displaying information for the administrator. In the ID: field, enter the VCI string seen in the table in Appendix C.5.2 (OpenStageWL3). Then click “OK”.

TIP: Click on the right side of the filed to be able to write in ASCII.

NOTE: The VCI string has to exactly match with the vendor specification, since it is used in the mapping of the information sent from the handset in option 60 (case sensitive)

Configure Sub-options for a vendor class in an MS Windows 2003 DHCP Server

The current sup-options string for the handset contains two codes (which in some documentation from vendors, are referred to as "tags".) In order to build these two codes, they have to be defined as follows: one with the value of Siemens, and one with the IP-address of the WSG (Device Manager application).

1 Right click on the DHCP server and select "Set Predefined Options".

2 Select the vendor class created earlier (in section Define new vendor class to support multiple types of clients) under “Option class” and click “Add”. The Option type window opens.

3 Enter a descriptive name for the first sub-option, for example enter, in the Name: field: “VoWiFi Vendor”, and in the Description: field: “Vendor Magic ID”

4 In the Data type: field, select “Binary”, to allow the entering of more than one byte.

5 In the Code: field, enter “001”. Then click “OK”.

NOTE: A predefined value (by selecting Edit Array) isn’t needed to be entered here. It can be preferred to be set per scope instead (explained below).

6 For the second sub-option, repeat the steps 1- 2 above.

7 Enter a descriptive name for the second sub-option, for example enter, in the Name: field: “WSG IP address”, and also copy it into the Description: field.

8 In the Data type: field, select “Binary”, to allow the entering of more than one byte.

9 In the Code: field, enter “002”. Then click “OK”.

10 Add the two sub-options to a scope and assign the values needed as follows:

Right click on your scope, then select Scope Options > Configure Options.

11 Select the Advanced tab. In the Vendor class: field, select the new vendor class that was created in section Define new vendor class to support multiple types of clients (SiemensWL3 handset). Checkmark the two sub-options that appear (“001 VoWiFi Vendor“ and “002 WSG IP address”.

NOTE: In the User class: field, leave the “Default User Class”.

12 Select the first sub-option “001 VoWiFi Vendor“ and enter the Vendor magic ID (Siemens or in Binary/Hex: 53 69 65 6D 65 6E 73. Click to the left of the box for Binary code, and to the right for ASCII code.

NOTE: Remove the 00 that is entered by default.

NOTE: A length value (in Data: field) isn’t needed to be entered here (as normally done, when entering a TLV record). Then click “OK”.

13 Select the second sub-option“002 WSG IP address” and enter the WSG IP address in Binary/Hex or ASCII. Then click “OK”.

14 Test the configuration by factory reset a handset. If the configuration doesn’t work, do a trace with a sniffer to see why.

TIP: Install Wireshark on the DHCP server and filter on the “bootp” protocol, to view the packet exchange when a handset is started up.

Configuration of DHCP options in a Cisco device running the Cisco IOS DHCP Server

The Cisco IOS DHCP server only allows Option 43 definitions for one device type for each DHCP address pool, so only one device type can be supported for each DHCP address pool. Complete these steps in order to configure DHCP Option 43 for VoWiFi handsets:

1 Enter the configuration mode at the Cisco IOS command line interface (CLI).

2 Create the DHCP pool, which includes the necessary parameters, such as the default router and the server name. This is an example DHCP scope:

ip dhcp pool <pool name>

network <ip network> <netmask>

default-router <default-router IP address>

dns-server <dns server IP address>

3 Add the Option 60 line with the following syntax:

option 60 ascii "VCI string of the handset"

NOTE: Avoid raw DHCP Option 43 without the specification of a VCI. Raw DHCP Option 43 limits the DHCP server to support a single device type for vendor specific information for each DHCP scope. Also, every DHCP client receives the Option 43 values in a DHCP Offer, regardless of whether the values are relevant to the device.

4 For the VCI string, use the value above. The quotation marks must be included.

Add the Option 43 line with the following syntax:

option 43 hex <hexadecimal string>

This hexadecimal string is assembled as a sequence of the TLV values for the Option 43 sub-option: Type + Length + Value, as described above.

C.5.7 Easy Deployment and VLAN

In a VoWiFi system, the WSG used for configuration must be positioned in the Voice VLAN, even if it is actually a data device (since the Voice and the Messaging services cannot be separated to two different SSIDs and thus not simply mapped to different VLAN in the AP/controller.

A mapping rule can, though, be created, that uses TCP/UDP port mapping, and connects the two services to different VLANs, instead of mapping SSIDs.

VLANS are not defined in the 802.11 standard. To achieve the same traffic separation for example between a Data and a Voice VLAN (and maybe including even a Deployment/Management VLAN), different SSIDs are used which are mapped to different VLAN IDs in the AP/Controller. The WLAN system must, therefore, be set up to support multiple SSIDs.

If using the AWS-INIT SSID on a single AP, be sure that the handset also can associate to the production SSID, after it has received its full configuration from the WSG (Device Manager application used for Easy Deployment.)

Remember that, when getting the production WLAN SSID, that it may be mapped to another VLAN, and that the IP address is changed, and also, that the DHCP server options are served by another scope, or eventually another DHCP server.

If using a deployment VLAN, you may be forced to have two Device Managers, or arranged for routing between VLANs.

You may try using a direct configuration of option 60 and option 43 on a scope by scope basis, if your system allows the separation of DHCP client devices to use independent scope ranges.

C.5.8 Easy Deployment and Certificates

NOTE: If using a security model that requires certificates, also use an NTP server, to assure the correct time in the handset, as certificates only are valid within a certain time.

Client certificate

If the production network is using individual client certificates, which for example are required for using EAP-TLS, first associate the certificates to the predefined number in the WSG (Device Manager) used for Easy Deployment, and after that select the required client certificate. Perform the steps, as described below in this section.

TIP: If there is no client certificate in the WSG (Device Manager) used for Easy Deployment, the handset is disconnected from the WLAN. To recover from this, first do a factory reset, and be sure that the client certificates are associated with the correct Number. You can also use the WinPDM to install the correct client certificate. Then try again.

Root certificate

Upload at least one “Self-signed certificate” and up to three “Intermediate certificates”, which are used to establish the trust chain of the server certificate. The commonly understood name of these certificate types is “Root certificate”. Perform the steps of association of the root certificates as described below.

TIP: Information about certificates is described in the WSG Installation and Operation Manual (and also in the WinPDM Installation and Operation Manual), see .11. Related Documents on page 79

Associate root/client certificates:

1 In the Numbers tab, right-click the handset’s number and select “Manage certificates“. A Manage certificate window opens.

2 In the Root tab and Client tab, click “Browse“ and select the certificates to import. Click “Close“.

Select required client certificate:

3 In the Numbers tab, right-click the handset’s number and select “Edit parameters“.

4 Select “Network X“ (X represents A, B, C, or D).

5 In the Security mode drop-down list, select “EAP-TLS“.

6 In the EAP client certificate drop-down list, select the client certificate to be used. Click “OK“.

C.5.9 Troubleshooting Easy Deployment in an MS 2003/2008 DHCP Server

If you, by mistake, create a predefined DCHP option, and want to remove it, the server sometimes denies this operation (even if you have created the DHCP option). This is indicated by a grey Delete button. In such case, open a command prompt and use the “netsh” command as follows:

netsh dhcp server \\servername delete optiondef xx

where xx is the option number.

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